NOTICE

All drawings located at the end of the document.

9403

QUARTERLY REPORT

FOR APRIL THROUGH JUNE 1993

OPERABLE UNIT 1
IM/IRA TREATMENT
FACILITY

PREPARED BY

ENVIRONMENTAL RESTORATION
FACILITIES OPERATIONS MANAGEMENT

EG&G ROCKY FLATS, INC.

1.0 INTRODUCTION

The Operable Unit No. 1 (OU-1) treatment facility located on the 881 Hillside in Building 891 is responsible for treating groundwater collected from the 881 hillside area. The water is collected in a french drain located south of Building 891 on the 881 Hillside and pumped to the influent storage tanks located at Building 891 (see Figure 1). Next, the water is treated with an ultraviolet light/hydrogen peroxide system (for removal of Volatile Organic Compounds) and a four-step ion-exchange system (for removal of uranium, Total Dissolved Solids, Total Suspended Solids, cations, anions, and selected metals). After treatment, the water is stored in one of three effluent storage tanks until laboratory sample results verify that the water is acceptable for discharge into the South Interceptor Ditch (SID).

2.0 INFLUENT WATER CHARACTERISTICS

Influent water for the treatment facility comes from three different sources on the 881 Hillside. These sources include the 881 footing drain, the recovery well CW001 (located upgradient of the french drain), and groundwater intercepted by the french drain. Water from the footing drain flows by gravity into the french drain, mixes with groundwater, and collectively flows by gravity towards the french drain sump. Recovery well water is pumped directly into the french drain sump and mixed with the groundwater/footing drain water. The combined water is then pumped from the french drain sump into the treatment system influent holding tanks.

2.1 INFLUENT FLOW RATES

The recovery well pump (see Figure 2 for construction details) operated for 56.2 minutes during April and for 6.2 minutes during the month of June. No pump time was shown in May. It was estimated (using pump curve) from these pumping times that approximately 310 gallons of water was pumped from the recovery well during the second quarter.

A flow meter was installed at the footing drain in late May in order to track flowrates in a more consistent manner. Flowrates were previously measured using a bucket and stopwatch. This method showed that flowrates from the footing drain remained at about 10 GPM during the early portion of the quarter (see Figure 3). Downward trends in the flowrate were observed in the middle of April. No data is available for a period of approximately one month due to installation and calibration activities on the new flow meter. However, data taken from May 27 through June 22 indicates that flow reached its normal state of 2-3 GPM with peak flowrates after periods of precipitation.

An estimate of the groundwater contribution to the system is difficult to obtain due to the accuracy of the flow measuring equipment (±10%) currently in place. Comparisons were made

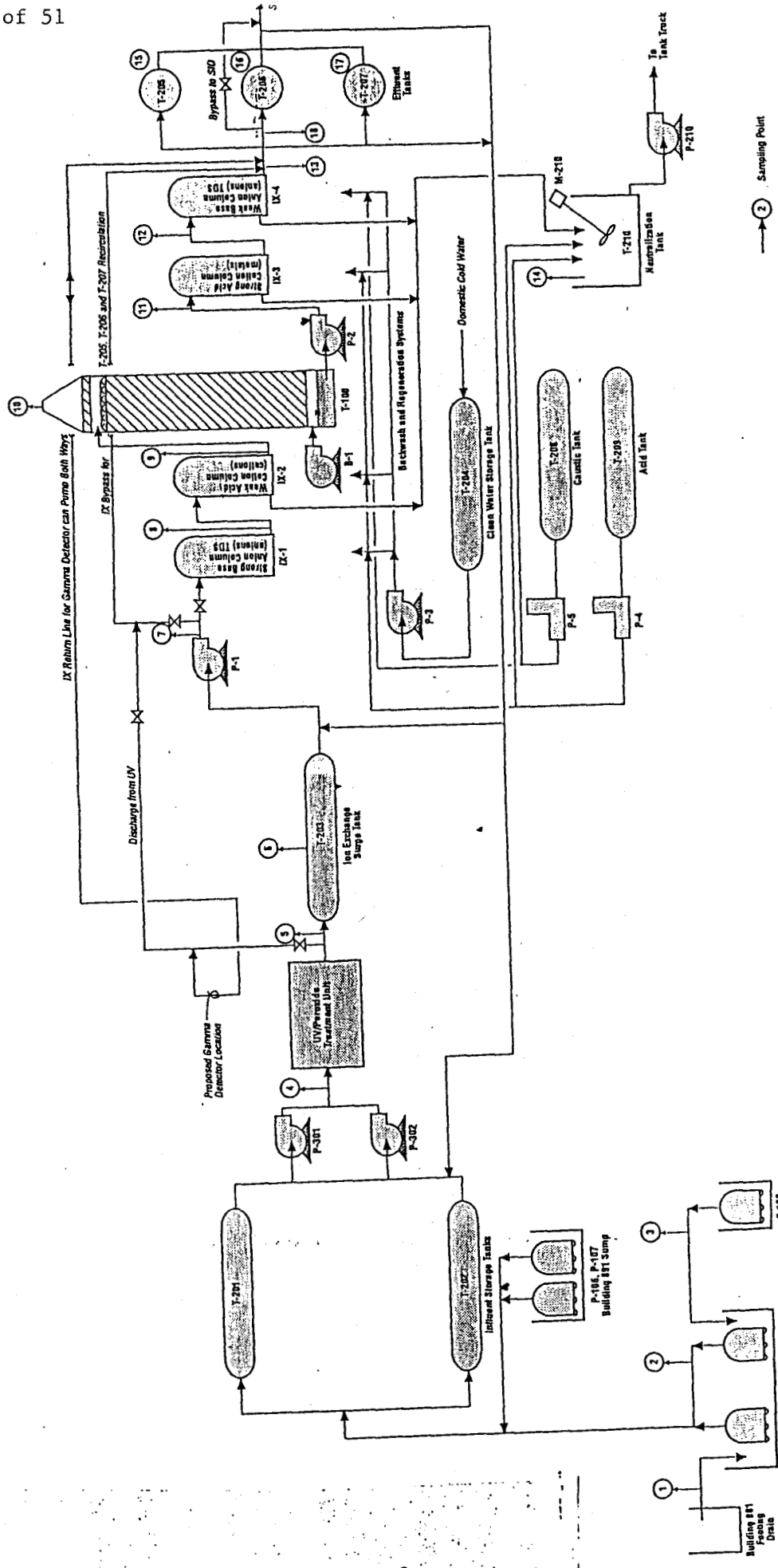


FIGURE 1
PROCESS FLOW DIAGRAM

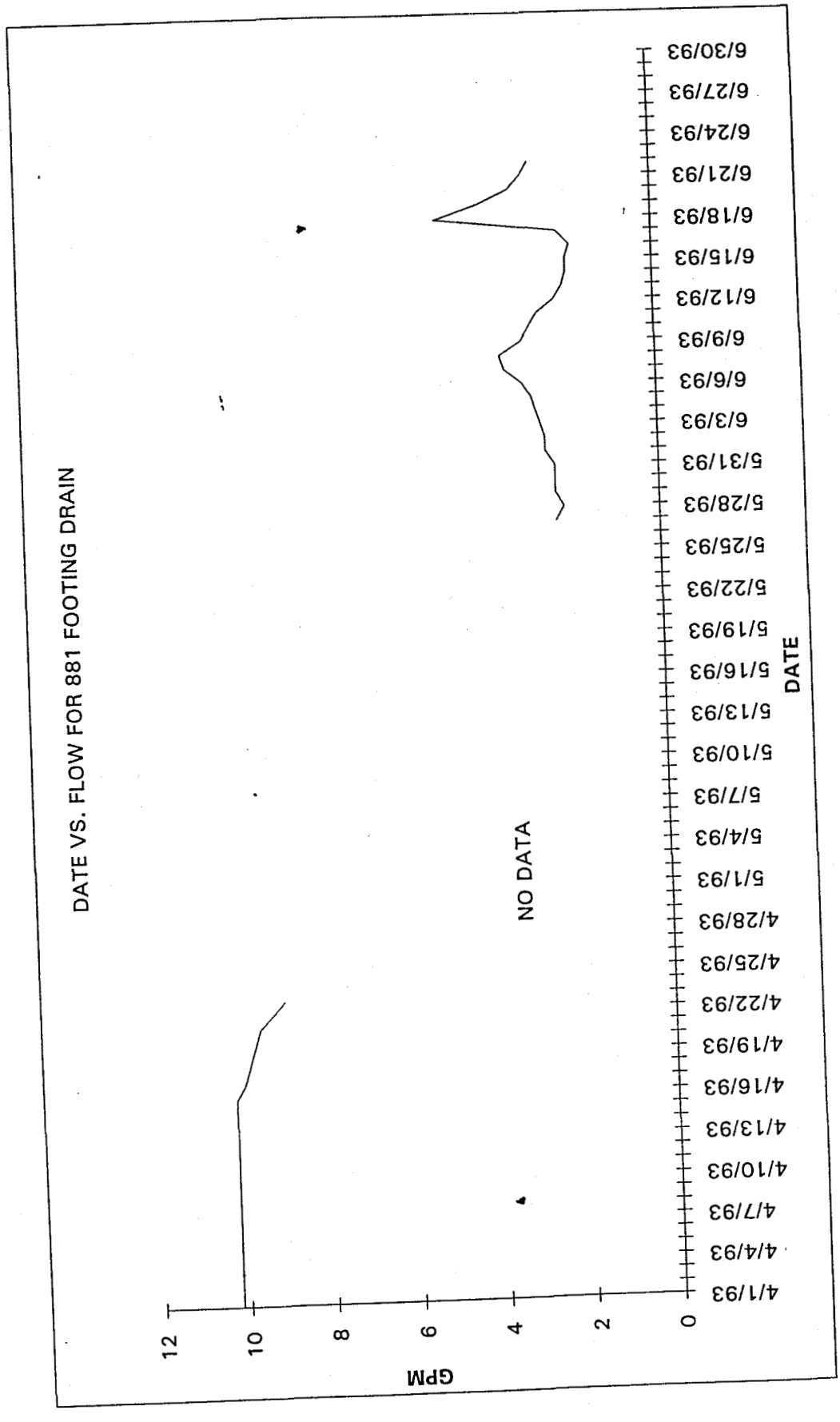

DATE VS. FLOW FOR 881 FOOTING DRAIN
GPM
12
10
8
6
4
2
0
NO DATA
DATE
4/1/93
4/4/93
4/7/93
4/10/93
4/13/93
4/16/93
4/19/93
4/22/93
4/25/93
4/28/93
5/1/93
5/4/93
5/7/93
5/10/93
5/13/93
5/16/93
5/19/93
5/22/93
5/25/93
5/28/93
5/31/93
6/3/93
6/6/93
6/9/93
6/12/93
6/15/93
6/18/93
6/21/93
6/24/93
6/27/93
6/30/93

FIGURE 3

between the footing drain/collection well flow and the quantity of water treated through the plant. Water in the influent tanks was added to the total treated to reach a total volume collected over time. After analyzing this data, it was found that during an average month (80,000 gallons collected), an error of ±10% gives a possible range of 72,000 to 88,000 gallons treated. Therefore, the french drain contribution is difficult to determine from this information. Additionally, the difference in levels of french drain over time, makes this type of analysis even more difficult. However, it remains apparent from the data collected that the groundwater contribution to the system is less than 10% of the total volume of water treated.

The influent flow totalizer which had been removed for repair will be reinstalled in September 1993. The totalizer will provide more information about influent flows and the contribution from each source. In addition, more precise flowmeters will be installed in order to more accurately measure flowrates within the system.

2.2 INFLUENT CONTAMINANTS

Samples of the 881 footing drain, recovery well, and french drain composite water were obtained periodically to determine the characterization of the influent waters. Contaminants above ARAR (ARAR's are for dissolved analysis) were found at all locations in limited quantities during the quarter. A summary, "INFLUENT CONTAMINANTS ABOVE ARAR FOR SECOND QUARTER 1993", is provided in Table 1. Only a few instances of contaminants above ARAR were noted in the second quarter of sampling for 1993. Trichloroethene, TDS, selenium, and methylene chloride (also found in lab blank) were the primary contaminants found in the samples.

3.0 FRENCH DRAIN MONITORING WELLS

The French Drain Performance Monitoring Plan (FDPMP) requires additional sample data for monitoring french drain performance. The FDPMP requires groundwater level measurements of designated french drain monitoring wells 10092, 10192, 10292, 10392, 10492, 10592, 10692, 10792, 10892, 10992, 11092, 39991, 45391, 4887, 35691, 31491, and 4787. Additionally, quarterly water quality sampling of the wells is required. Well 39991 was monitored through the second quarter, but was abandoned early in the third quarter due to excessive damage to the well. The variation of water levels in 45391 remains unsolved.

3.1 WATER LEVELS

Groundwater level measurements were taken throughout the duration of the second quarter of 1993. The weekly water level monitoring data (tables and hydrographs) collected in the french drain area is presented in Appendix A. As can be seen in the hydrographs

SUMMARY OF INFLUENT SAMPLES ABOVE ARAR FOR 2ND QUARTER 1993

LOCATION	SAMPLE #	ANAL.	DATE	ANALYTE	CONC.	ARAR (Dissolved for metals and rads)
REC WELL	FT00154ITU1	Full	4/7/93	TDS	791 ppm	400 ppm
				Selenium (Total)	535 ppb	10 ppb
				Trichloroethene	10 ppb	5 ppb
	FT10005RG	Full	4/29/93	TDS	815 ppm	400 ppm
				Alpha (Total)	20 pci/l	15 pci/l
				Selenium (Total)	572 ppb	10 ppb
				Trichloroethene	6 ppb	5 ppb
	FT10033RG	Full	6/11/93	TDS	771 ppm	400 ppm
				Selenium (Total)	470 ppb	10 ppb
				bis(2-Ethylhexyl)Pthal.	11 ppb	N/A
	FT10044RG	V	6/16/93	Pending		
FOOT DR	FT10004RG	Full	4/29/93	TDS	526 ppm	400 ppm
				Isophorone	9 (J) ppb	N/A
	FT10031RG	Full *	6/11/93	TDS	589 ppm	400 ppm
				Methylene Chloride	28 (B) ppb	5 ppb
	FT10032RG	R	6/11/93	Pending		
FR DRAIN	FT10035RG	Full*	6/11/93	Methylene Chloride	29 (B) ppb	5 ppb
				TDS	575 ppm	400 ppm
	FT10036RG	R	6/11/93	Pending		
UV INF	FT00157ITU1	V,TDS	4/15/93	Trichlorethene	11 ppb	5 ppb
	FT10006RG	Full	4/29/93	TDS	558 ppm	400 ppm
	FT10037RG	Full*	6/11/93	TDS	509 ppm	400 ppm
				Methylene Chloride	32 (B) ppb	5 ppb
	FT10038RG	R	6/11/93	Pending		

Full = Full suite of samples including VOA, Metals, Radionuclides, Water Quality, pH, Semi-volatile, and pesticide/PCB's.
Full* = Full suite without radionuclides
R = Radionuclides
V = Volatiles
TDS = Total Dissolved Solids
REC WELL = Recovery Well
B = Found in blank
FOOT DR = 881 Footing Drain
FR DRAIN = French Drain Composite
UV INF = Influent to the UV/Peroxide Unit
J = Value estimated
Total = Analyte sampled for total rather than dissolved

TABLE 1

(note different scales of graphs) the water levels at these wells fluctuate from 0 to a maximum of 4 feet. The majority of the wells are dry through the wet spring season. A water table elevation map (Figure 4) from April 1993 is also included to illustrate this point.

The hydrologic information presented here supports a conclusion that the french drain is effective in collecting ground water from the alluvial (upper hydrostratigraphic) unit at the 881 hillside. Additionally, the fact that the majority of the wells are dry and all levels fluctuate very little indicates that the alluvial groundwater system has reached steady state after installation of the french drain a year ago. A case for curtailing the weekly water level readings is expected to be presented to EPA/CDH in September.

3.2 CONTAMINANTS

There was very little data available for the second quarter report due to the fact that most sampling activities took place late in the quarter (see Table 2). All data that was not available for the first quarter report was included in the second quarter report. As was evident in the first quarter report, some low level contamination can be found in wells downgradient of the french drain at the western end. Only dissolved analysis were reported in for comparison to ARAR's (except as noted).

4.0 800 AREA SURFACE WATER MONITORING STATIONS

Surface water flowmeters were installed in three locations at outfalls on the south side of the 800 area parking lot. These flowmeters were placed into service on June 1, 1993. Flows were measured (no data for GS19) for the month of June (see Figures 5,6), but no samples were taken during this month. A minimum of .15 inches of rain is currently needed to trigger the automatic sampler. The instrument will be adjusted so that less rainfall is needed to trigger the sampler.

5.0 TREATMENT FACILITY PERFORMANCE

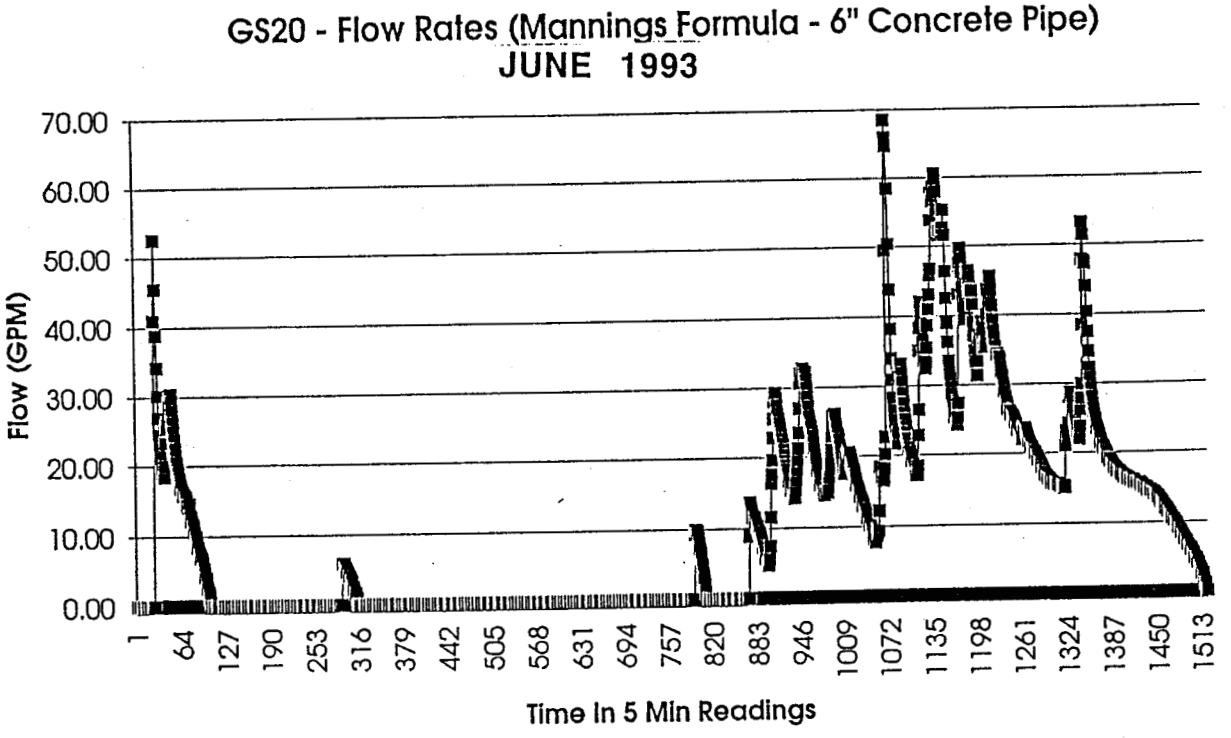
The treatment system performance is measured by various criteria. Quantity of water treated, contamination destruction or removal efficiency, waste generation, operating costs, chemical usage, and system reliability.

Also, samples were taken this quarter from each ion exchange column to check performance of the resins. Resin sample results indicated that the resins remain in good condition. The IX4 column resin, however, showed a slight reduction in total capacity.

FRENCH DRAIN MONITORING WELL CONTAMINANTS ABOVE ARAR

WELL NUMBER	DATE	COMPOUND	CONCENTRATION	ARAR
35691	11/5/92	SULFATE	360 mG/L	250 mG/L
	11/5/92	TDS	1300 mG/L	400 mG/L
	3/15/93	SULFATE	318 mG/L	250 mG/L
	3/15/93	TDS	1190 mG/L	400 mG/L
	11/5/92	DISS. GROSS ALPHA	16 PCI/L	15 PCI/L
	3/15/93	DISS. GROSS ALPHA	28 PCI/L	15 PCI/L
31491	4/30/93	CHLORIDE	260mG/L	250 mG/L
	4/30/93	SULFATE	2300 mG/L	250 mG/L
	4/30/93	TDS	2100 mG/L	400 mG/L
4887	3/10/93	CHLORIDE	280 mG/L	250 mG/L
	3/10/93	TDS	1100 mG/L	400 mG/L
39991	10/21/92	TDS	410 mG/L	400 mG/L
	3/1/93	TDS	410 mG/L	400 mG/L
	10/21/92	CARBON TETRACHL.	10 UG/L	5 UG/L
	10/21/92	TRICHLOROETHENE	30 UG/L	5UG/L
	3/1/93	CARBON TETRACHL.	9 UG/L	5 UG/L
	10/21/92	MANGANESE	146 UG/L	50 UG/L
	3/1/93	MANGANESE	195 UG/L	50 UG/L
10692	1/29/93	DISS. GROSS ALPHA	19 PCI/L	15 PCI/L
10592	1/29/93	TDS	1100 mG/L	400 mG/L
10492	1/29/93	DISS. GROSS ALPHA	22 PCI/L	15 PCI/L

TABLE 2



NOTE: DUE TO SEDIMENT BUILDUP AND IRREGULAR CULVERT SHAPE THE ERROR FOR THIS DATA IS APPROXIMATELY 15-20%

FIGURE 5

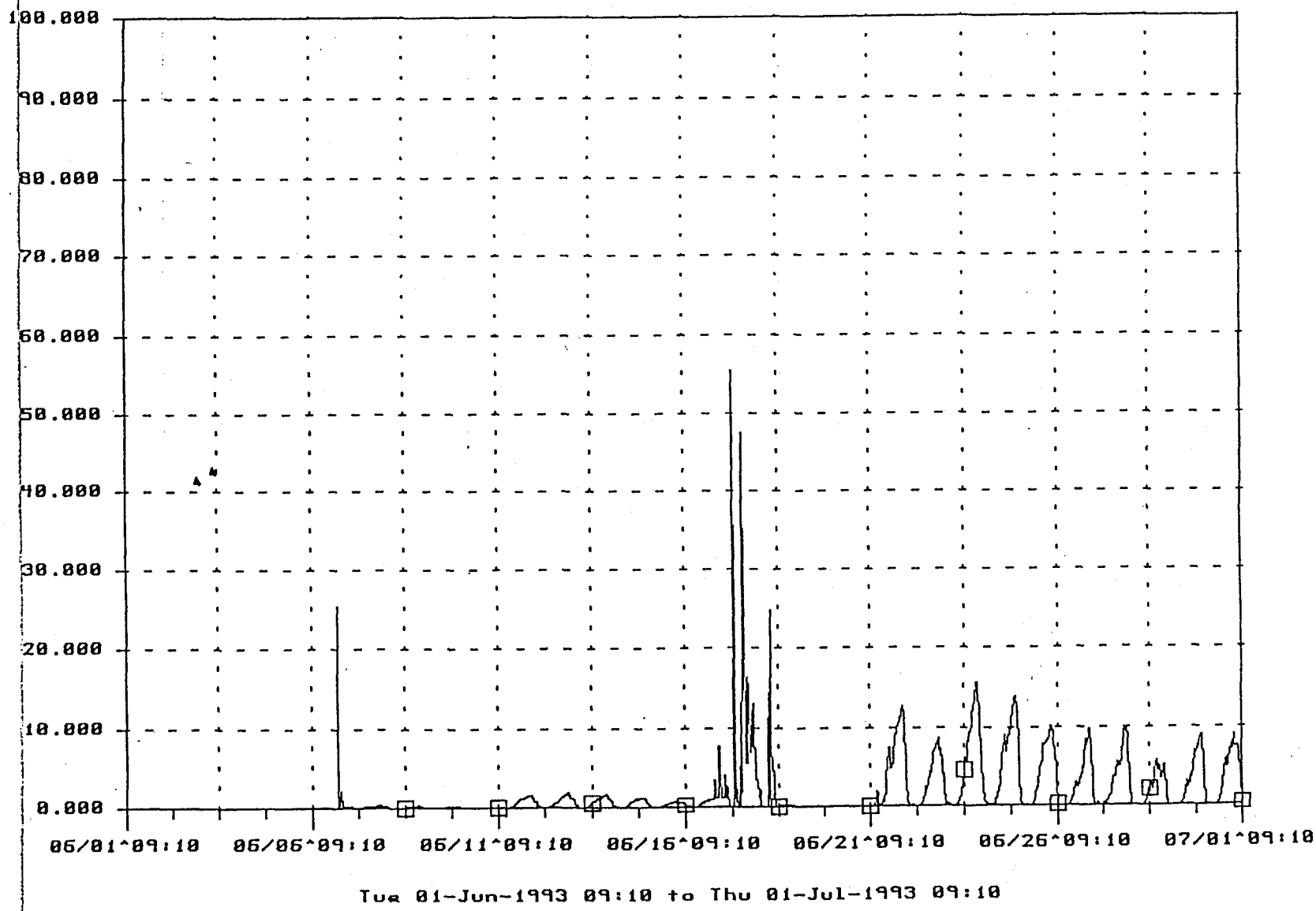

Surface Water Runoff & Pricipitaton: G521, 850 Parking Lot
Flow (GPM)
100.000
90.000
80.000
70.000
60.000
50.000
40.000
30.000
20.000
10.000
0.000
06/01^09:10
06/06^09:10
06/11^09:10
06/16^09:10
06/21^09:10
06/26^09:10
07/01^09:10
Tue 01-Jun-1993 09:10 to Thu 01-Jul-1993 09:10

FIGURE 6

5.1 QUANTITY OF WATER TREATED

A total of 513,000 gallons of water was treated during the second quarter of 1993. Three tanks of treated effluent totaling 340,000 gallons were released into the SID. The remainder of the water remains in storage tanks pending analysis or waiting for discharge (some water is being held to provide water to the wetland if needed). Approximately 1,400,000 gallons of water has been processed through the treatment system to date.

5.2 WATER FROM OTHER SOURCES

An estimated 5,000 gallons of decontamination pad water was treated during the quarter. One shipment of 2500 gallons of decontamination pad water contained 4,500 ppb of trichloroethene. This shipment was batched in the influent holding tanks with other decontamination pad water until it was ready for treatment. Initial influent samples (see Table 3-footnotes denote decontamination pad water samples) to the UV/Peroxide system showed that levels of carbon tetrachloride, acetone, 4-methyl 2-pentanone, and trichloroethene (TCE) that were found in decontamination waters were relatively low (less than 50 ppb). The significantly reduced level of TCE could be attributed to volatization during the transfer of the water to building 891 for treatment, or a poor quality lab result on the initial sample analysis. Modifications were made to the treatment plant to permit recirculation of decontamination water through the Ultra Violet/Hydrogen Peroxide Unit before running through the ion exchange system. However, increasing temperatures of the water due to multiple passes through the UV unit caused problems with possible tank coating leaching problems. Higher levels of contaminants were found in subsequent samples taken of this water. The water was held for cooling and then treated through the system on a single pass to avoid any problems with long residence times at high temperatures.

5.3 CONTAMINATION DESTRUCTION/REMOVAL EFFICIENCY

A comparison of the UV Peroxide influent and effluent samples is presented in Table 3. This table shows effectiveness in the treatment of volatile organics. However, laboratory quality problems have limited the conclusions that can be drawn from this data.

A comparison of the removal efficiency across Ion exchange column #1 will be provided in the third quarter report. Sufficient data has not yet been acquired to perform this analysis.

All discharged water met ARAR's for this quarter. Effluent tank T-206 water that did not meet ARAR for TDS was successfully retreated to levels below ARAR during the second quarter and was released during the early third quarter.

SUMMARY OF UV/PEROXIDE PERFORMANCE FIRST AND SECOND QUARTERS 1993						
DATE	CONTAMINANT*	UV/PEROXIDE INFLUENT		UV PEROXIDE EFFLUENT		ARAR
		SAMPLE #	RESULT	SAMPLE #	RESULT	
4/15/93	Trichloroethene	FT00157ITU1	11	FT00158ITU1	5U	5
	Unknown	FT00157ITU1	N/A	FT00158ITU1	6J	N/A
	Acetone	FT00157ITU1	10U	FT00158ITU1	56	50
	Chloroform	FT00157ITU1	4J	FT00158ITU1	4J	N/A
	Carbon Tetrachloride	FT00157ITU1	2J	FT00158ITU1	5U	5
6/1/93 +	Methylene Chloride	FT10019RG	4BJ	FT10020RG	5B	5
	Acetone	FT10019RG	15	FT10020RG	62B	50
	Trichloroethene	FT10019RG	13	FT10020RG	1J	5
	4-Methyl, 2-Pentanone	FT10019RG	49	FT10020RG	13	N/A
	Tetrachloroethene	FT10019RG	1J	FT10020RG	5U	5
	Xylene	FT10019RG	5	FT10020RG	5U	N/A
	Chloroform	FT10019RG	2J	FT10020RG	3J	N/A
6/2/93 +	Acetone	FT10022RG	53B	FT10023RG	73B	50
	Chloroform	FT10022RG	2J	FT10023RG	2J	N/A
	4-Methyl, 2-Pentanone	FT10022RG	12	FT10023RG	2J	N/A
	Xylene	FT10022RG	2J	FT10023RG	5U	N/A
	Methylene Chloride	FT10022RG	5U	FT10023RG	3BJ	5
6/3/93 +	Methylene Chloride	FT10024RG	4BJ	FT10025RG	5U	5
	Acetone	FT10024RG	86B	FT10025RG	91B	50
	4-Methyl, 2-Pentanone	FT10024RG	250	FT10025RG	18	N/A
	Ethylbenzene	FT10024RG	19	FT10025RG	5U	N/A
	Xylene	FT10024RG	130	FT10025RG	5U	N/A
	Chloroform	FT10024RG	10U	FT10025RG	2J	N/A
6/16/93 +	Acetone	FT10028RG	27B	FT10029RG	22B	50
	Chloroform		1J		1J	N/A
	Methylene Chloride		2BJ		5U	5
6/11/93	Methylene Chloride	FT10037RG	32B	FT10038RG	31B	5
	Acetone		7BJ		13B	50
	Tetrachloroethene		1J		5U	5
7/7/93	Tetrachloroethene	FT10057RG	1J	FT10058RG	5U	5
7/27/93	Acetone	FT10069RG	10U	FT10070RG	46	50
(+) Decontamination pad water-multiple passes of same water.		J = Value estimated				
U = Not detected to listed value		B = Found in laboratory blank				
*Only detected or estimated contaminants are noted.						

TABLE 3

5.4 CHEMICAL USAGE

Approximately 2,000 gallons of hydrochloric acid and 900 gallons of sodium hydroxide were used for regeneration/neutralization activities during the second quarter. Operation of the UV/Peroxide unit required the use of 50 gallons of 50% peroxide.

5.5 POWER USAGE

A new meter for the power usage has not yet been installed. The low resolution on the current meter is not sufficient to accurately obtain power usage measurements.

5.6 WASTE GENERATION

Waste generated at the treatment facility includes sock filters and neutralized regenerant water. Less than one 55 gallon drum of sock filters has been collected over a span of 15 months of operation at the facility. Ten truckloads (30,000 gallons) of neutralized regenerant water was shipped to the 374 evaporator during the second quarter of 1993.

5.7 OPERATING COSTS

Subcontracted operating costs for the 891 facility totaled $112,000 dollars for the second quarter of 1993. This cost includes $72,000 paid to the new subcontractor that took over May 1, 1993. The other $40,000 was the cost associated with closeout activities for the old subcontractor. These costs include chemical purchases, spare parts, labor, and document preparation.

5.8 MAINTENANCE PROBLEMS

The lower distributor in ion exchange vessel #3 was found to be broken in early April. The resin was removed from the vessel and temporarily placed into drums while the distributor was replaced. The cause of the break is currently unknown. Once the repairs had been performed, the resin was placed back into the vessel and normal operation resumed. This repair required two days of downtime. However, the collection of french drain water continued through this period and compliance violations were therefore avoided.

Some difficulties with pH probes have been experienced on the ion exchange system. The meters were replaced and are now functional. Portable pH meters were used while the in-line meters were not functional.

Problems were experienced with one shipment of caustic that was delivered. The concentration of the caustic that was delivered was between 51 and 52% (as opposed to 50% which was specified to

the vendor). This was a problem due to the fact that sodium hydroxide will solidify at warmer temperatures when concentrations higher than 51% are reached. The following data as provided by the vendor demonstrates this point.

Concentration	Crystallization Point (F)
50%	55
51%	56
52%	68

In addition, some troubleshooting on the programmable logic controller has been periodically required.

6.0 WETLANDS MITIGATION

The OU1 Wetland Revegetation Plan was completed by the middle of May 1993. Willows, cattails, bulrush, and three-square were planted in order to properly mitigate the wetland area. Maps have not yet been completed of the area as it was planted. This work is scheduled for August as part of the wetland status report. However, the actual vegetation placement is very similar to the original plan (refer to Figure 7). Treated effluent water from tank T-206 was used to provide water to the wetland area on July 6 (7,000 gallons) and July 8 (17,000 gallons). Water was needed since the area had become very dry due to lack of precipitation.

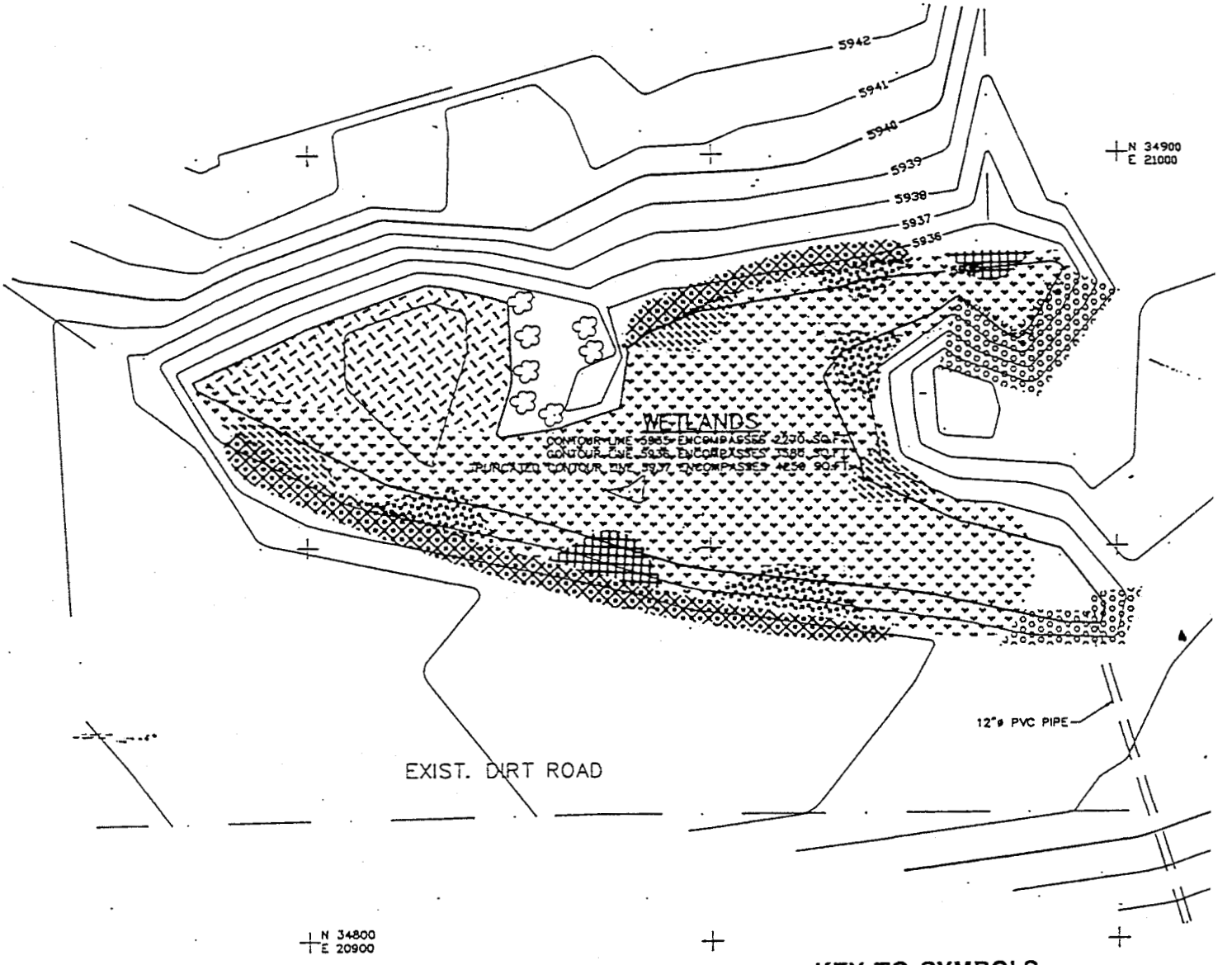
7.0 TREATMENT FACILITY SAMPLING

Water samples are taken at OU-1 to characterize the influent groundwater, assure that neutralization water from regeneration of the ion exchange system is acceptable for the 374 evaporator, monitor the ion exchange resin performance, and to verify that all discharge standards are met. Water that is sent to the 374 evaporator is analyzed for pH and gross alpha in the 881 General Labs. A summary of the treatment facility samples taken during the second quarter can be found in Table 4.

8.0 ENVIRONMENTAL COMPLIANCE

All water discharged from the OU-1 Treatment Facility met all discharge standards for the second quarter. No releases of hazardous materials to the environment occurred.

The real-time gamma analyzer is tested and in place. It will be utilized in conjunction with an in-line Gas Chromatograph to continuously monitor the quality of treated effluent water. The gas chromatograph has been procured and will most likely be delivered some time in November or December.



KEY TO SYMBOLS

- Existing cattails
- Planted cattails
- Planted softstem bulrush
- Planted three-square bulrush
- Planted mixed bulrush
- Planted sandbar willow

CP 278
N 34718.4430
E 20167.5640
ELEV. = 5959.50'
FND. #5 REBAR
0.1' BELOW SURFACE

N 84°27'49"W
725.06'

SEE NOTE 1

CP 9021
N 34648.4910
E 20889.2440
FND. 60D NAIL
FLUSH WITH EXISTING
SURFACE

1993 SECOND QUARTER H2O SAMPLES

SAMPLE #	LOCATION	ANALYSIS	STATUS
FT00151ITU1	Neutralization Tank	Rad Screen	Accept for 374
FT00152ITU1	Effluent Tank T-206	TDS, Conductivity, pH	Not accept for discharge
FT00153ITU1	Effluent Tank T-205	VOA,Mtl,WQ,Rad,NO,BNA, Pest,Con.	On file
FT00154ITU1	Recovery well	VOA,Mtl,WQ,Rad,NO,BNA, Pest	On file
FT00155ITU1	UV Effluent	VOA, Mtl,WQ,NO	On file
FT00156ITU1	Neutralization Tank	Rad Screen	Accept for 374
FT00157ITU1	UV Influent	VOA, TDS	On file
FT00158ITU1	UV effluent	VOA,TDS	On File
FT00159ITU1	Neutralization Tank	Rad Screen	Accept for 374
FT00160ITU1	Neutralization Tank	Rad Screen	Accept for 374
FT10000RG	Effluent Tank T-207	VOA,Mtl,Rads,WQ	Accept for discharge
FT10001RG	Neutralization Tank	Rad Screen	Accept for 374
FT10002RG	Neutralization Tank	Rad Screen	Accept for 374
FT10003RG	Neutralization Tank	Rad Screen	Accept for 374
FT10004RG	Footing Drain	VOA,Mtl,Rad,BNA,Pest,WQ,NO,pH,Con.	On file
FT10005RG	Recovery Well	VOA,Mtl,Rad,BNA,Pest,WQ,NO,pH,Con.	On file
FT10006RG	UV Influent	VOA,Mtl,Rad,WQ,NO,pH,Con.	On file
FT10007RG	IX1 Influent	VOA,Mtl,Rad,WQ,NO,pH,Con.	On file
FT10008RG	IX1 Effluent	Rads	On file
FT10009RG	Neutralization Tank	Rad Screen	Accept for 374
FT10010RG	Neutralization Tank	Rad Screen	Accept for 374
FT10011RG	Neutralization Tank	Rad Screen	Accept for 374
FT10012RG	Effluent Tank T-205	Rads	Accept for discharge
FT10013RG	Effluent Tank T-205	VOA, Mtl, WQ, NO, pH	Accept for discharge
FT10014RG	Neutralization Tank	Rad Screen	Accept for 374
FT10015RG	Effluent Tank T-207	Rad Screen	On file
FT10016RG	Effluent Tank T-207	VOA, Mtl,WQ, NO	Accept for dishcarge
FT10017RG	Effluent Tank T-207	Rads	Accept for Discharge
FT10018RG	Neutralization Tank	Rad Screen	Accept for 374
FT10019RG	UV Influent	VOA	On file
FT10020RG	UV Effluent	VOA	On file
FT10021RG	UV Influent	VOA	On file
FT10022RG	UV Influent	VOA	On file
FT10023RG	UV Effluent	VOA	On file
FT10024RG	UV Influent	VOA	On file
FT10025RG	UV Effluent	VOA	On file
FT10026RG	UV Influent	VOA	Sample broken
FT10027RG	UV Effluent	VOA	On file
FT10028RG	UV Influent	VOA	Pending analysis
FT10029RG	UV Effluent	VOA	Pending anylsis
FT10030RG	Neutralization Tank	Rad Screen	Accept for 374
FT10031RG	Footing Drain	VOA,BNA,MTL,PEST,WQ,NO,pH,cond	On file

TABLE 4

1993 SECOND QUARTER H2O SAMPLES

SAMPLE #	LOCATION	ANALYSIS	STATUS
FT10032RG	Footing Drain	Rads	Pending Analysis
FT10033RG	Recovery Well	VOA,BNA,MTL,PEST,WQ,NO,pH,cond	On file
FT10034RG	Recovery Well	Rads	Pending Analysis
FT10035RG	French Drain	VOA,BNA,MTL,PEST,WQ,NO,pH,cond	On file
FT10036RG	French Drain	Rads	Pending analysis
FT10037RG	UV Influent	VOA,Mtl,WQ,NO,pH,Con	On file
FT10038RG	UV Influent	Rads	Pending analysis
FT10039RG	UV Effluent	VOA, Mtl, WQ, pH, Cond.,	On file
FT10040RG	IX1 Influent	Rads	Pending analysis
FT10041RG	IX1 Effluent	Rads	Pending analysis
FT10042RG	UV Effluent	Rads	Pending analysis
FT10043RG	Effluent Tank T-206	TDS	Accept for discharge
FT10044RG	Recovery Well	VOA	Pending analysis
FT10045RG	Neutralization Tank	Rad Screen	Accept for 374
FT10046RG	Neutralization Tank	Rad Screen	Accept for 374
FT10047RG	IX1 Resin	Rad Screen	On file
9360171	IX3 Resin	Resin Evaluation	Analysis Pending
9360172	IX4 Resin	Resin Evaluation	Analysis Pending
FT10048RG	IX1 Resin	Resin Evaluation	On file
FT10049RG	IX2 Resin	Resin Evaluation	On file
FT10050RG	IX3 Resin	Resin Evaluation	On file
FT10051RG	IX4 Resin	Resin Evaluation	On file
FT10052RG	Netutralization Tank	Rad Screen	On file

Rads= Radionuclides (inclues uranium, plutonium, tritium, gross alpha/beta, strontium
VOA= Volatile Organics
BNA= Semivolatile Organics
WQ= Water quality parameters
Mtl= Metals
Pest= Pesticides/PCB's
NO= Nitrate/nitrite
Cond.= Conductivity

No drums of hazardous or low level radioactive waste were filled up to the end of the second quarter. Compliance issues may be involved once filter sock drums are full.

9.0 REPORTS AND CORRESPONDENCE

A screening level risk assessment was prepared to formulate a case to discontinue the collection of the 881 footing drain water.

A case is being prepared to discontinue weekly water levels for the french drain monitoring wells.

10.0 ANTICIPATED OPERATIONS FOR NEXT QUARTER

Normal operations and maintenance activities will continue during the third quarter. It is anticipated that treatment of groundwater can be completed during normal working hours during the third quarter of operation. Currently no overtime is anticipated for the third quarter.

11.0 SUMMARY/CONCLUSIONS

The total volume of water treated during this quarter was significantly greater than those volumes treated in the past. This was most likely due to seasonal conditions and will not be experienced again until next spring. Overall, 513,000 gallons of water were treated and 340,000 gallons of treated water was discharged during the quarter. All discharged water met ARAR's.

The hydrogeologic information gathered through the french drain monitoring wells supports the conclusion that the french drain is effective in collecting groundwater from the alluvial (upper hydrostratigraphic) unit at the 881 hillside. The data also indicates that the system has reached a steady state condition.

APPENDIX A

WELL NUMBER: 10792

TOP OF CASING ELEVATION: 5917.10 FT

WELL DEPTH (TOP OF CASING): 26.26 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5893.78
4/9/93	5893.8
4/16/93	5892.88
4/23/93	DRY
4/30/93	5893.74
5/7/93	5893.84
5/14/93	5893.92
5/21/93	5893.91
5/28/93	5893.98
6/4/93	5894
6/11/93	5893.96
6/18/93	5892.38
6/25/93	5892.9

WELL NUMBE 10092

TOP OF CASING ELEVATION: 5900.47 FT

WELL DEPTH (TOP OF CASING): 23.08 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5877.51
4/9/93	5877.5
4/16/93	5877.51
4/23/93	DRY
4/30/93	DRY
5/7/93	DRY
5/14/93	DRY
5/21/93	DRY
5/28/93	DRY
6/4/93	DRY
6/11/93	DRY
6/18/93	DRY
6/25/93	DRY

WELL NUMBER: 10192

TOP OF CASING ELEVATION 5924.30 FT

WELL DEPTH (TOP OF CASING): 21.08 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	DRY
4/9/93	DRY
4/16/93	DRY
4/23/93	DRY
4/30/93	DRY
5/7/93	DRY
5/14/93	DRY
5/21/93	DRY
5/28/93	DRY
6/4/93	DRY
6/11/93	DRY
6/18/93	DRY
6/25/93	DRY

WELL NUMBER: 10292

TOP OF CASING ELEVATION: 5925.46

WELL DEPTH (TOP OF CASING): 26.28 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	DRY
4/9/93	DRY
4/16/93	DRY
4/23/93	DRY
4/30/93	DRY
5/7/93	DRY
5/14/93	DRY
5/21/93	DRY
5/28/93	DRY
6/4/93	DRY
6/11/93	DRY
6/18/93	DRY
6/25/93	DRY

WELL NUMBER: 10392

TOP OF CASING ELEVATION: 5932.05 FT

WELL DEPTH (TOP OF CASING): 29.07 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	DRY
4/9/93	DRY
4/16/93	DRY
4/23/93	DRY
4/30/93	DRY
5/7/93	DRY
5/14/93	DRY
5/21/93	DRY
5/28/93	DRY
6/4/93	DRY
6/11/93	DRY
6/18/93	DRY
6/25/93	DRY

WELL NUMBER: 10492

TOP OF CASING ELEVATION: 5932.81 FT

WELL DEPTH (TOP OF CASING): 34.4 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5902.53
4/9/93	5902.44
4/16/93	5902.42
4/23/93	5902.5
4/30/93	5902.42
5/7/93	5902.46
5/14/93	5902.33
5/21/93	5902.37
5/28/93	5902.32
6/4/93	5902.35
6/11/93	5902.31
6/18/93	5902.24
6/25/93	5902.23

WELL NUMBER: 10592

TOP OF CASING ELEVATION: 5937.93 FT

WELL DEPTH (TOP OF CASING): 28.19 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	DRY
4/9/93	5914.83
4/16/93	5913.39
4/23/93	5914.28
4/30/93	5915.08
5/7/93	5915.63
5/14/93	5916.79
5/21/93	5917.6
5/28/93	5918.37
6/4/93	5919.15
6/11/93	5919.8
6/18/93	5920.17
6/25/93	5911.83

WELL NUMBER: 10692

TOP OF CASING ELEVATION: 5943.60 FT

WELL DEPTH (TOP OF CASING): 23.44 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5939.07
4/9/93	5939.36
4/16/93	5939.45
4/23/93	5939.56
4/30/93	5939.36
5/7/93	5939.25
5/14/93	5938.82
5/21/93	5938.98
5/28/93	5938.79
6/4/93	5938.74
6/11/93	5938.54
6/18/93	5938.24
6/25/93	5938.35

WELL NUMBER: 10892

TOP OF CASING ELEVATION: 5929.2 FT

WELL DEPTH (TOP OF CASING): 26.28 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	DRY
4/9/93	DRY
4/16/93	DRY
4/23/93	DRY
4/30/93	DRY
5/7/93	DRY
5/14/93	DRY
5/21/93	DRY
5/28/93	DRY
6/4/93	DRY
6/11/93	DRY
6/18/93	DRY
6/25/93	DRY

WELL NUMBER: 10992

TOP OF CASING ELEVATION 5898.56 FT

WELL DEPTH (TOP OF CASING): 33.67 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	DRY
4/9/93	5866.85
4/16/93	5866.16
4/23/93	DRY
4/30/93	5866.73
5/7/93	5866.88
5/14/93	5867.12
5/21/93	5867.33
5/28/93	5867.58
6/4/93	5867.78
6/11/93	5867.95
6/18/93	5835.3
6/25/93	5866.3

WELL NUMBER: 11092

TOP OF CASING ELEVATION: 5895.31 FT

WELL DEPTH (TOP OF CASING): 23.06 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5872.74
4/9/93	5872.65
4/16/93	5872.63
4/23/93	DRY
4/30/93	5872.82
5/7/93	DRY
5/14/93	5872.95
5/21/93	5873.03
5/28/93	5873.15
6/4/93	5873.26
6/11/93	5873.38
6/18/93	5872.73
6/25/93	5872.86

WELL NUMBER: 45391

TOP OF CASING ELEVATION: 5894.24 FT

WELL DEPTH (TOP OF CASING): 23.49 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5868.9
4/9/93	5869.71
4/16/93	5871
4/23/93	DRY
4/30/93	5871.81
5/7/93	5872.15
5/14/93	5872.37
5/21/93	5864.32
5/28/93	5872.22
6/4/93	5871.11
6/11/93	5872.14
6/18/93	5869.25
6/25/93	5869.68

WELL NUMBER: 39991

TOP OF CASING ELEVATION: 5932.36 FT

WELL DEPTH (TOP OF CASING): 25.41 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5922.3
4/9/93	5922.32
4/16/93	5922.36
4/23/93	5922.25
4/30/93	5922.05
5/7/93	5921.88
5/14/93	5921.6
5/21/93	5921.73
5/28/93	5921.51
6/4/93	5921.36
6/11/93	5921.07
6/18/93	5920.96
6/25/93	5921.24

WELL NUMBER: 4787

TOP OF CASING ELEVATION: 5884.64 FT

WELL DEPTH (TOP OF CASING): 9.8 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5875.59
6/16/93	5876.24

WELL NUMBER: 4887

TOP OF CASING ELEVATION: 5911.41 FT

WELL DEPTH (TOP OF CASING): 12.37 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5905.24

WELL NUMBER: 31491

TOP OF CASING ELEVATION: 5905.03 FT

WELL DEPTH (TOP OF CASING): 23.66 FT

WATER LEVELS

DATE	WATER DEPTH
4/2/93	5881.95
4/29/93	5884.29

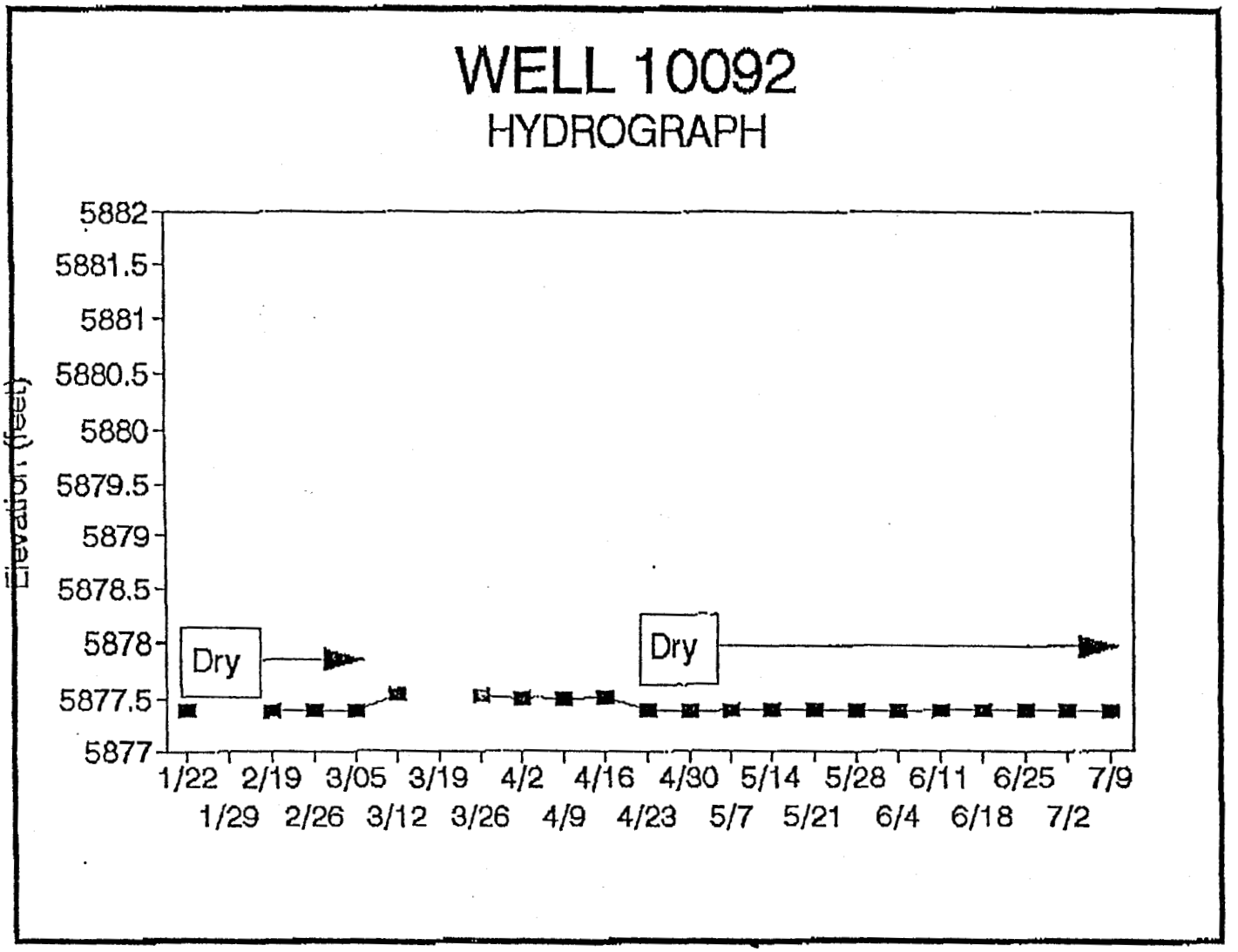
WELL NUMBER: 35691

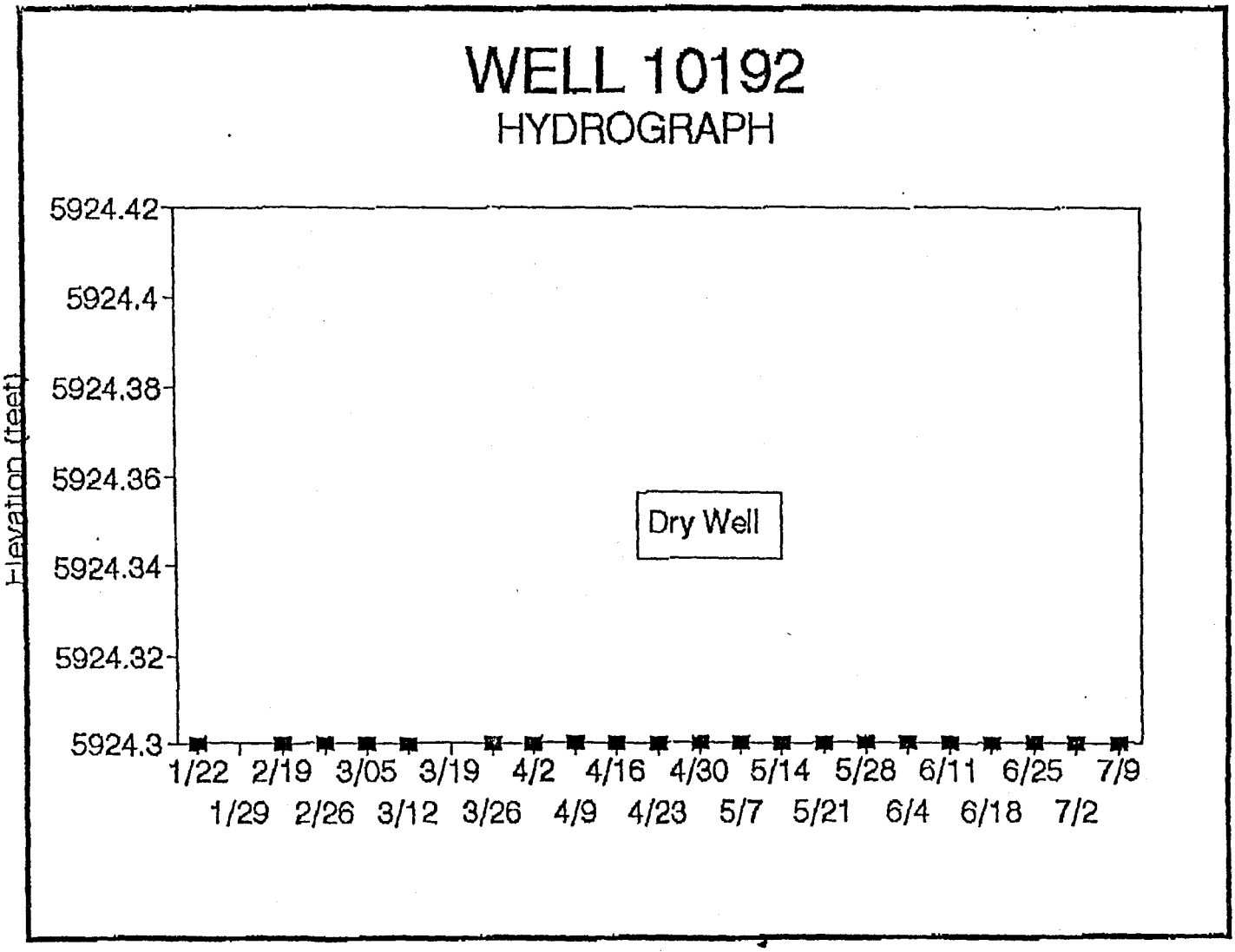
TOP OF CASING ELEVATION: 5941.36 FT

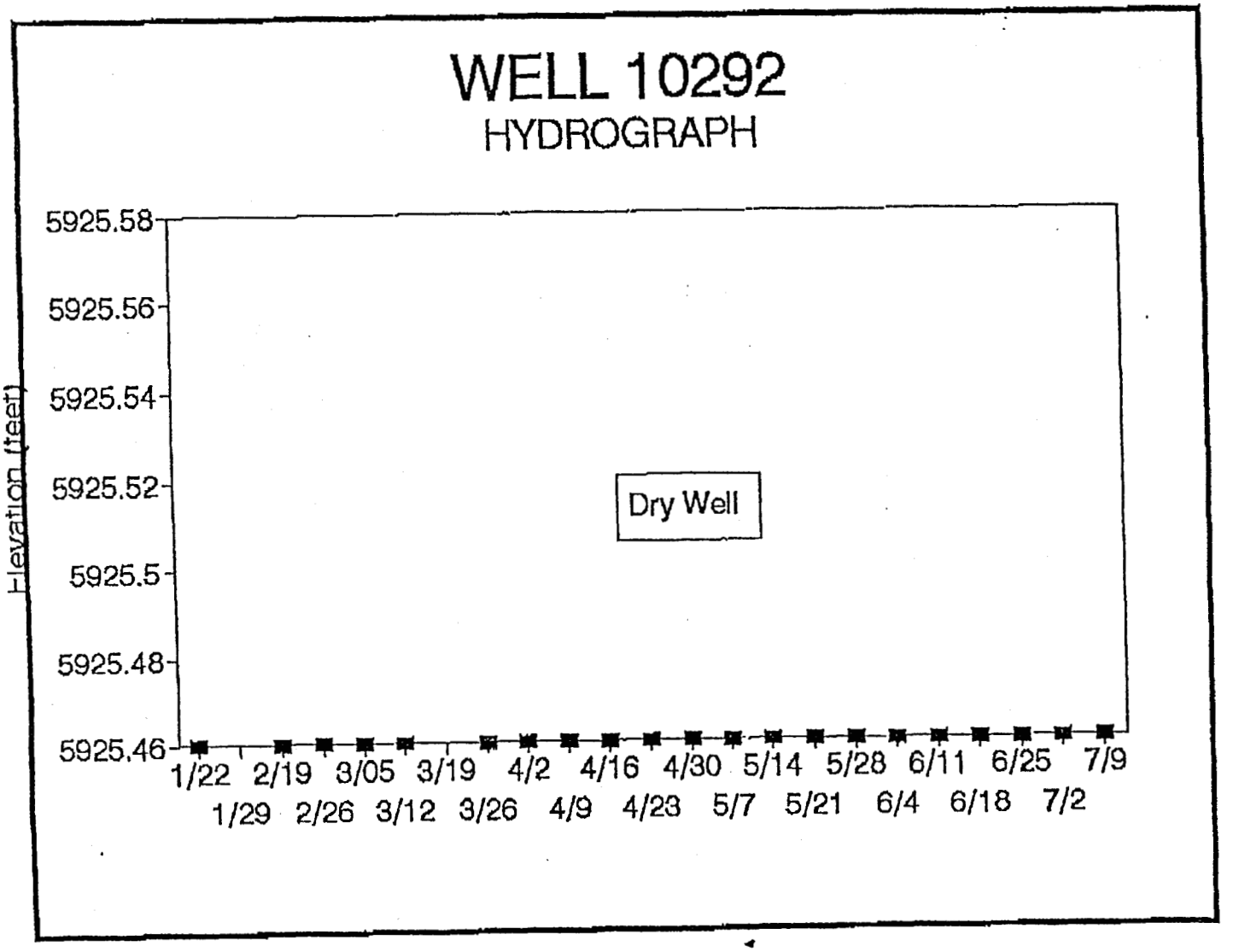
WELL DEPTH (TOP OF CASING): 30.46 FT

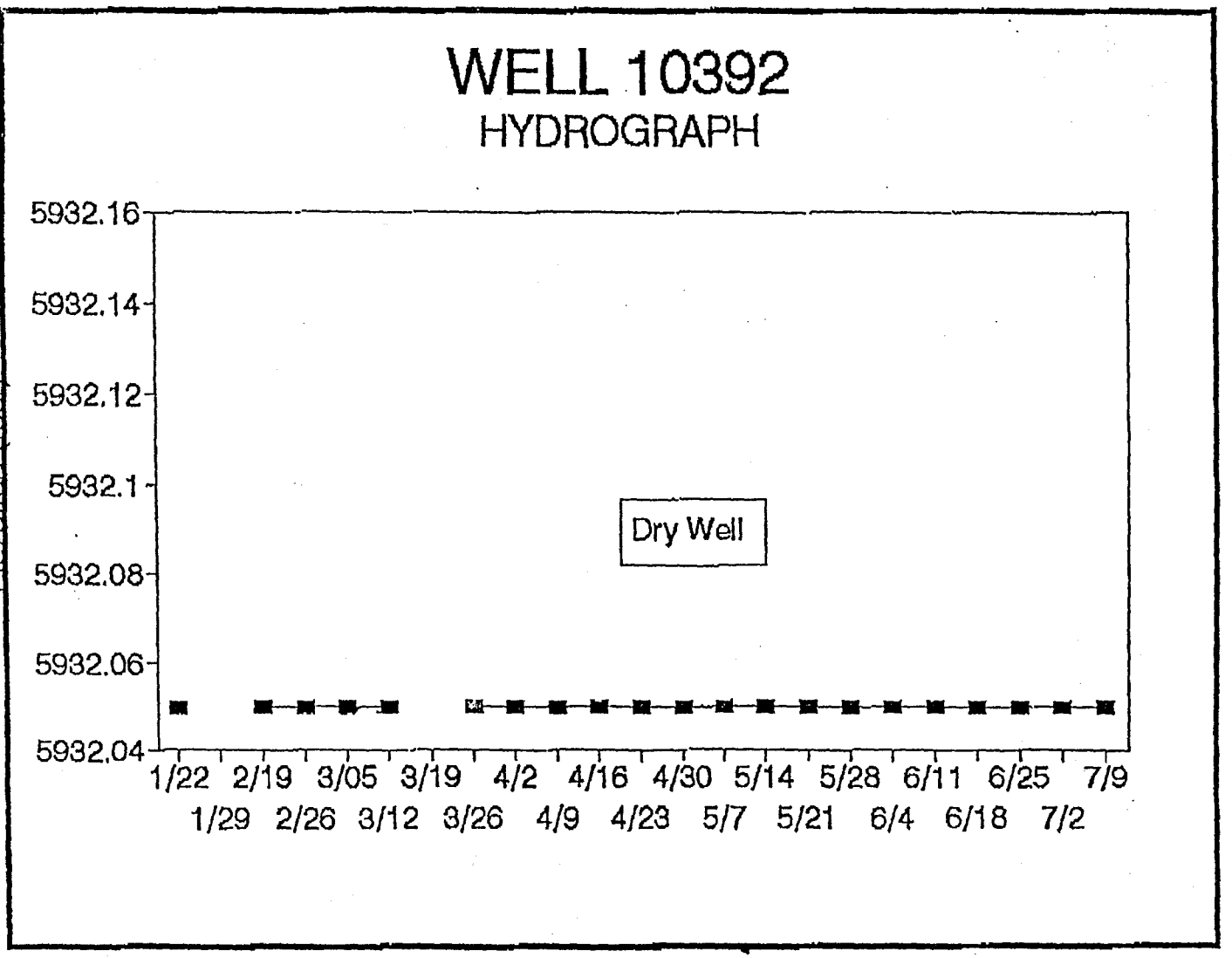
WATER LEVELS

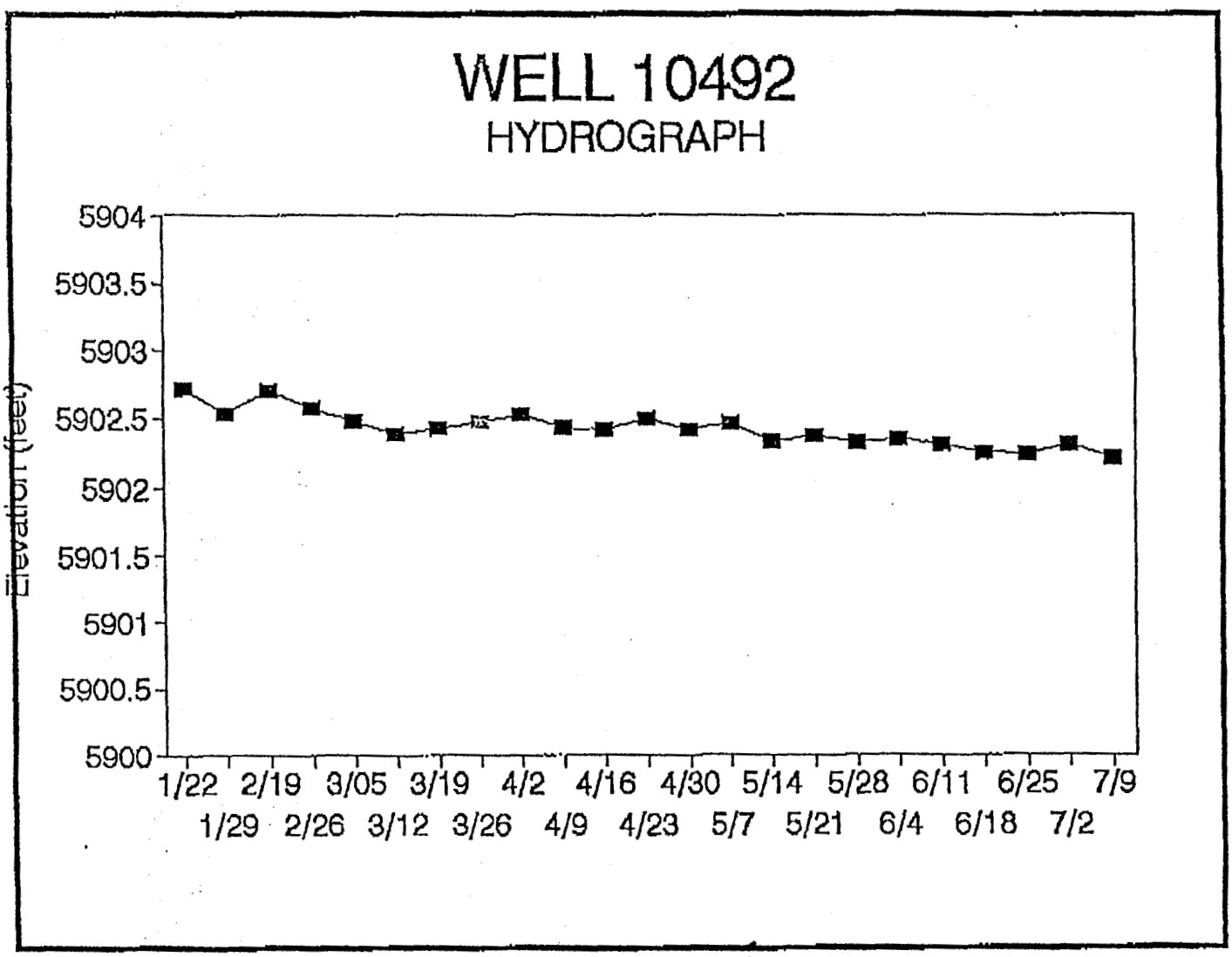
	WATER DEPTH
4/2/93	5922.51
5/19/93	5923.32


WELL 10092
HYDROGRAPH
Elevation (feet)
5882
5881.5
5881
5880.5
5880
5879.5
5879
5878.5
5878
5877.5
5877
Dry
Dry
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9


WELL 10192
HYDROGRAPH
Elevation (feet)
5924.42
5924.4
5924.38
5924.36
5924.34
5924.32
5924.3
Dry Well
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9


WELL 10292
HYDROGRAPH
Elevation (feet)
5925.58
5925.56
5925.54
5925.52
5925.5
5925.48
5925.46
Dry Well
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9


WELL 10392
HYDROGRAPH
Elevation (feet)
5932.16
5932.14
5932.12
5932.1
5932.08
5932.06
5932.04
Dry Well
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9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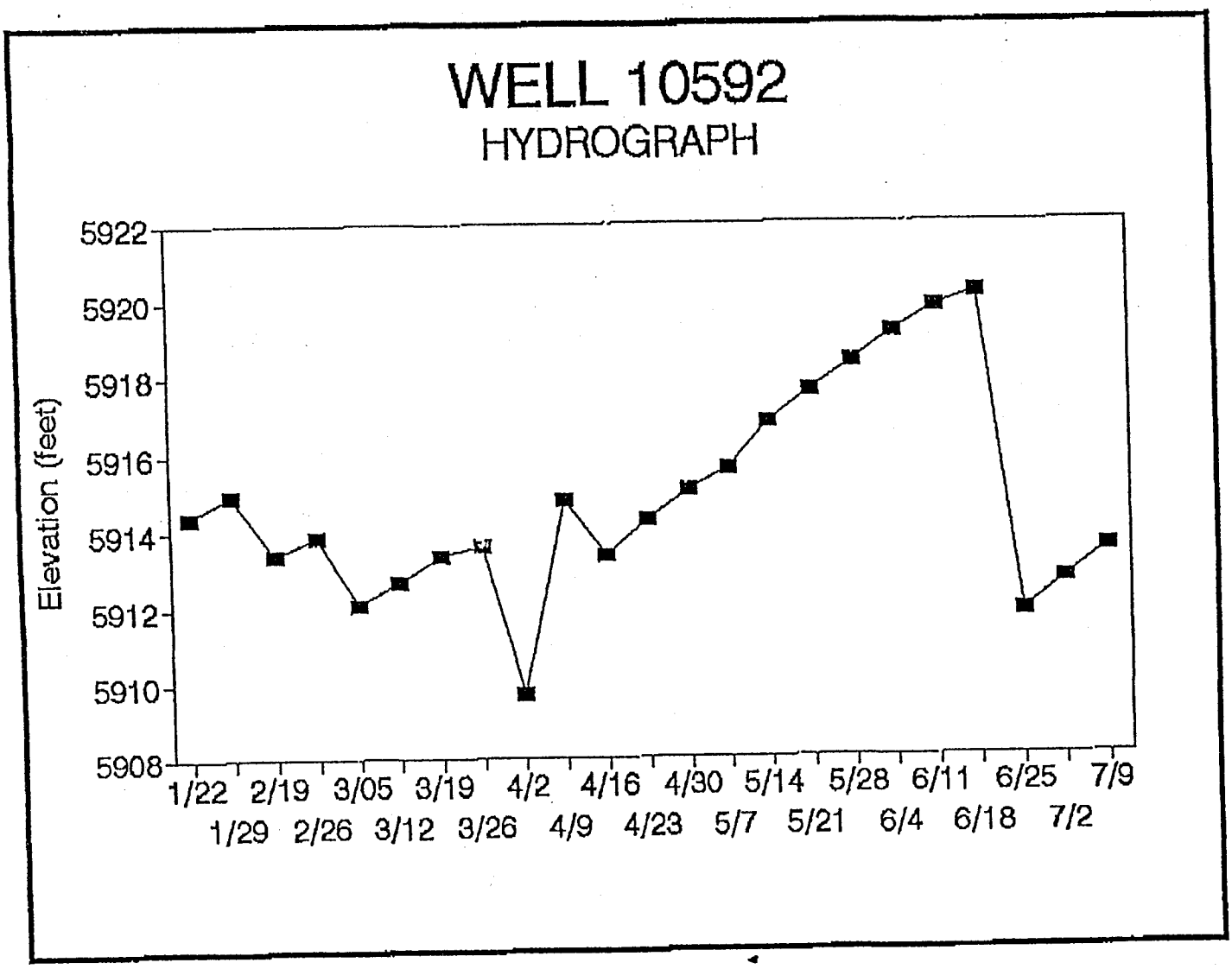
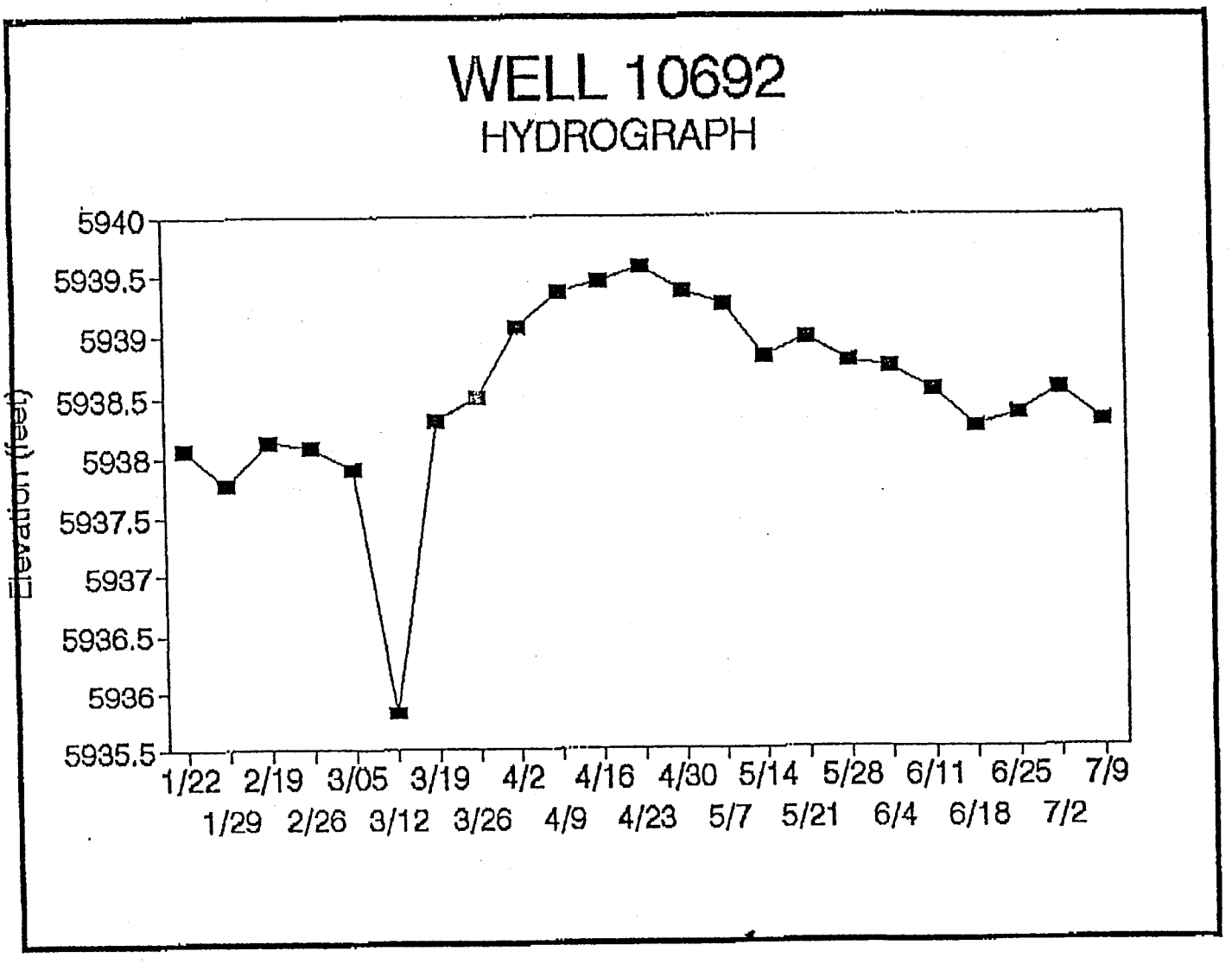
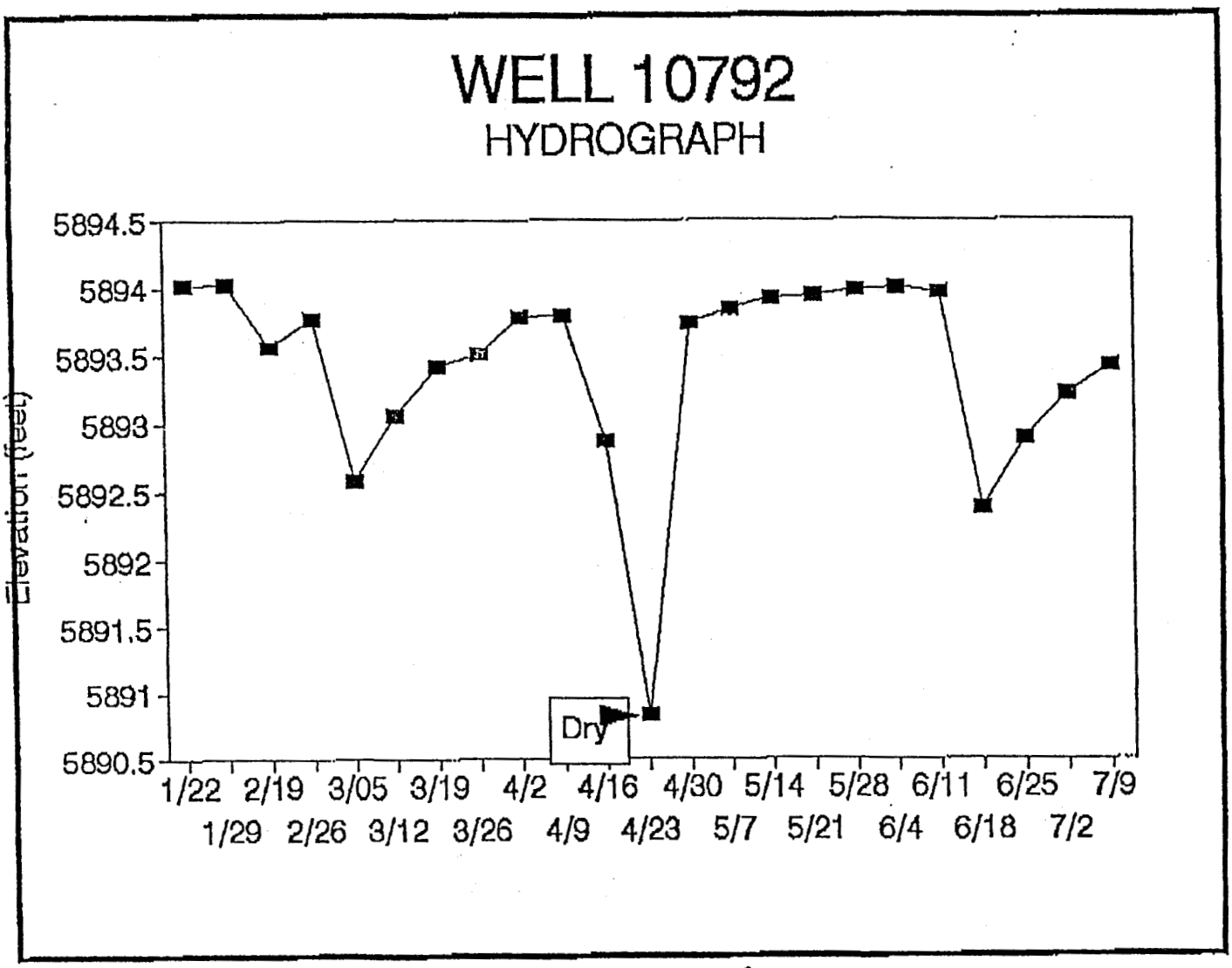
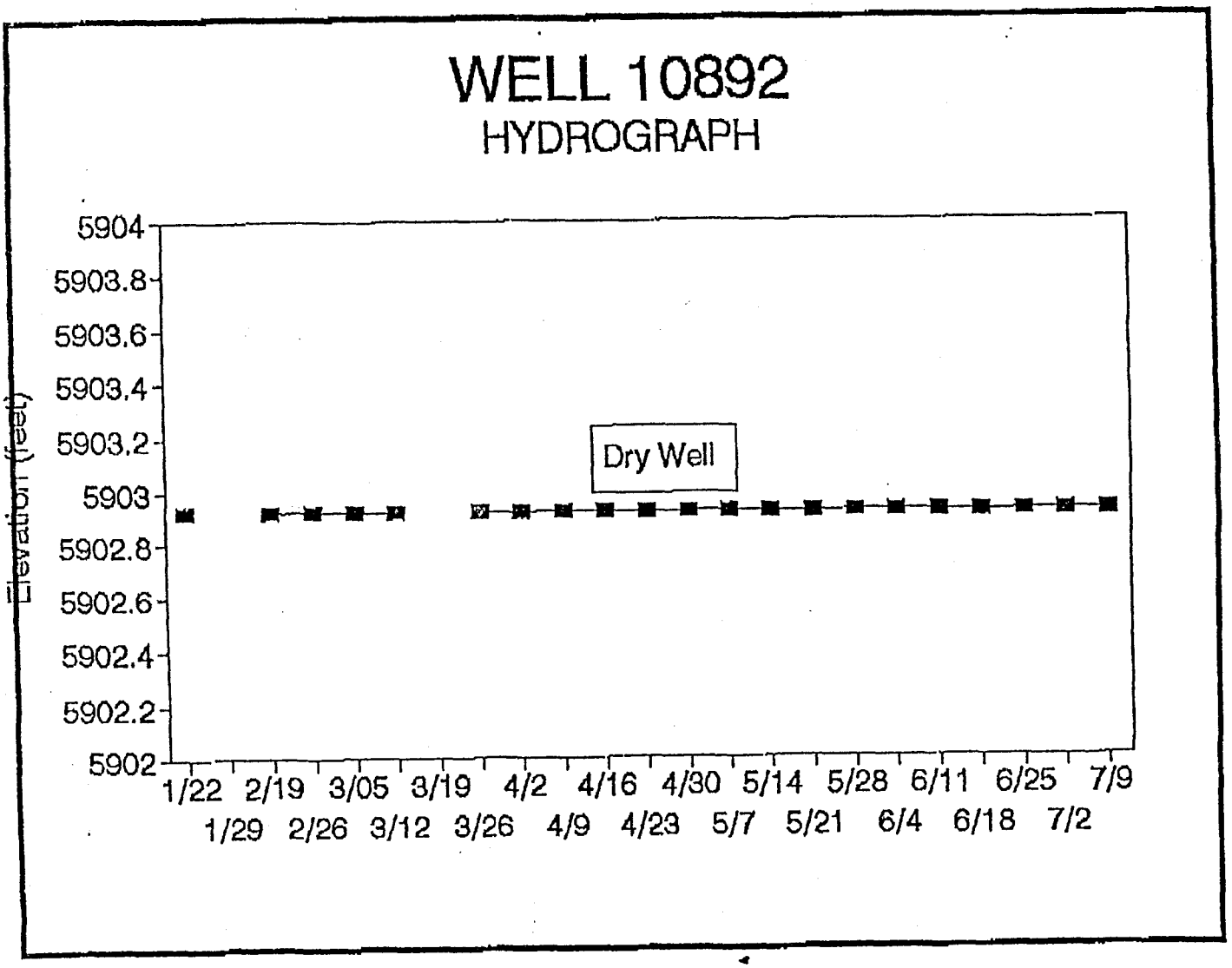
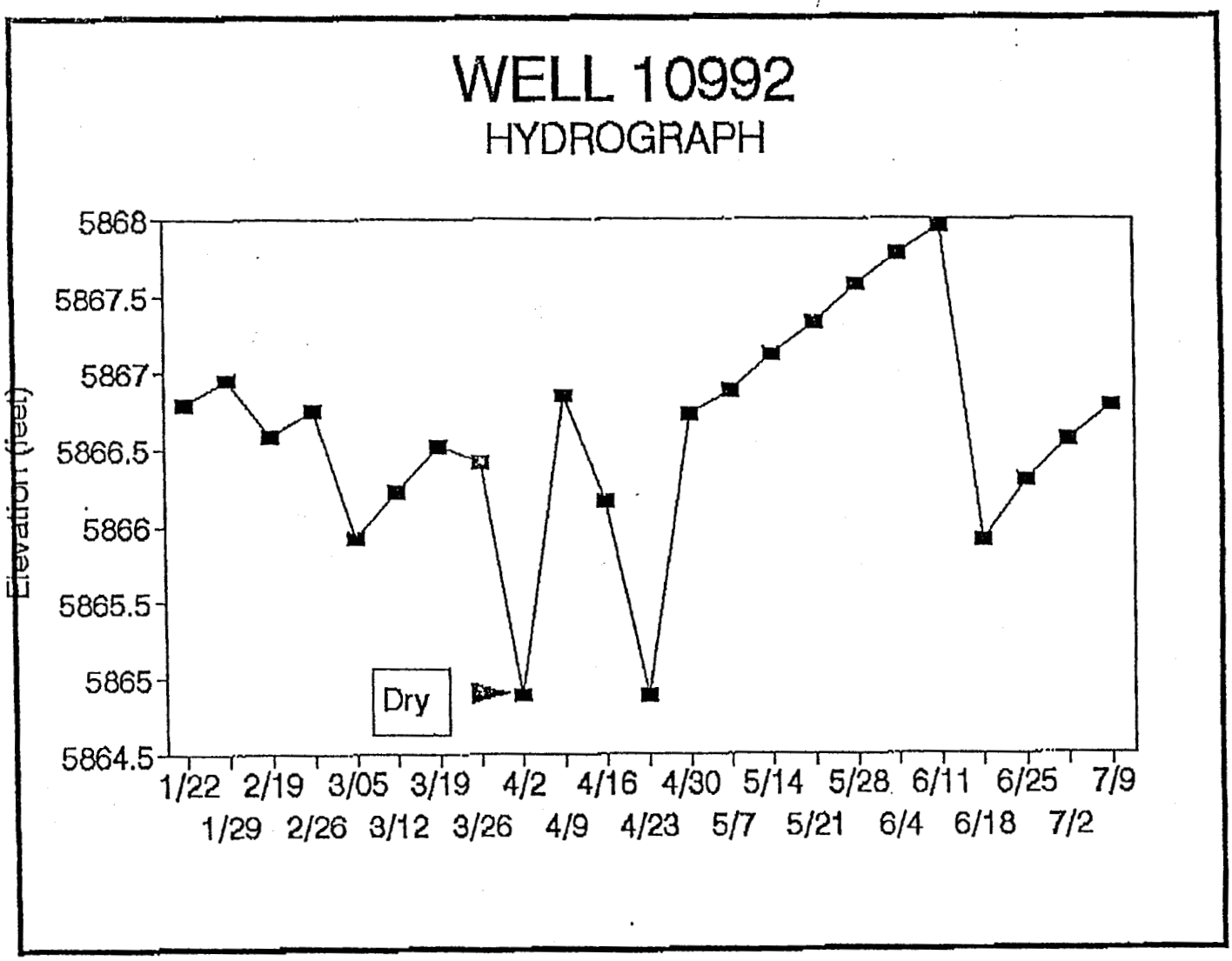
HYDROGRAPH
Elevation (feet)
5904
5903.5
5903
5902.5
5902
5901.5
5901
5900.5
5900
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9

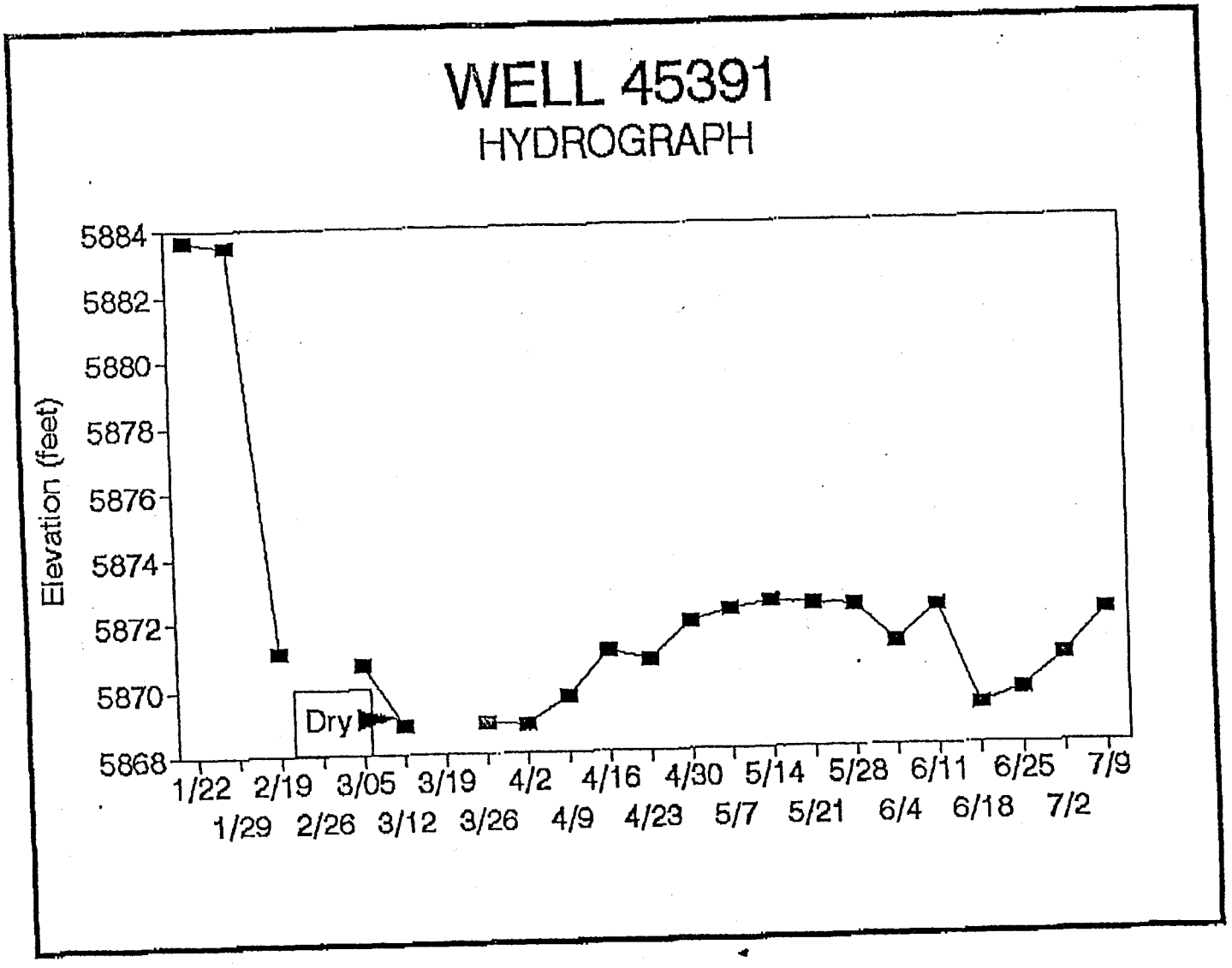

WELL 10592
HYDROGRAPH
Elevation (feet)
5922
5920
5918
5916
5914
5912
5910
5908
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9

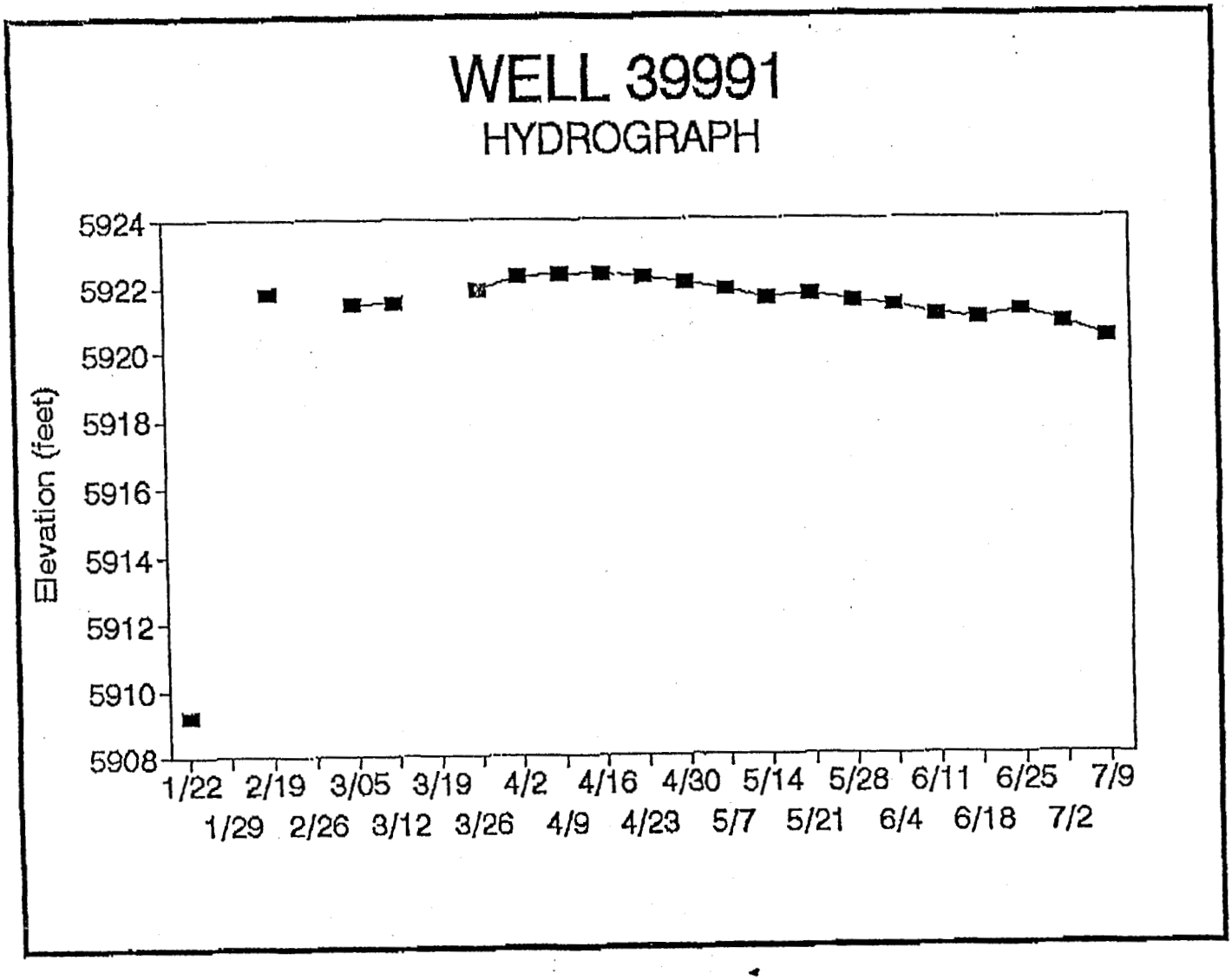

WELL 10692
HYDROGRAPH
Elevation (feet)
5940
5939.5
5939
5938.5
5938
5937.5
5937
5936.5
5936
5935.5
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9

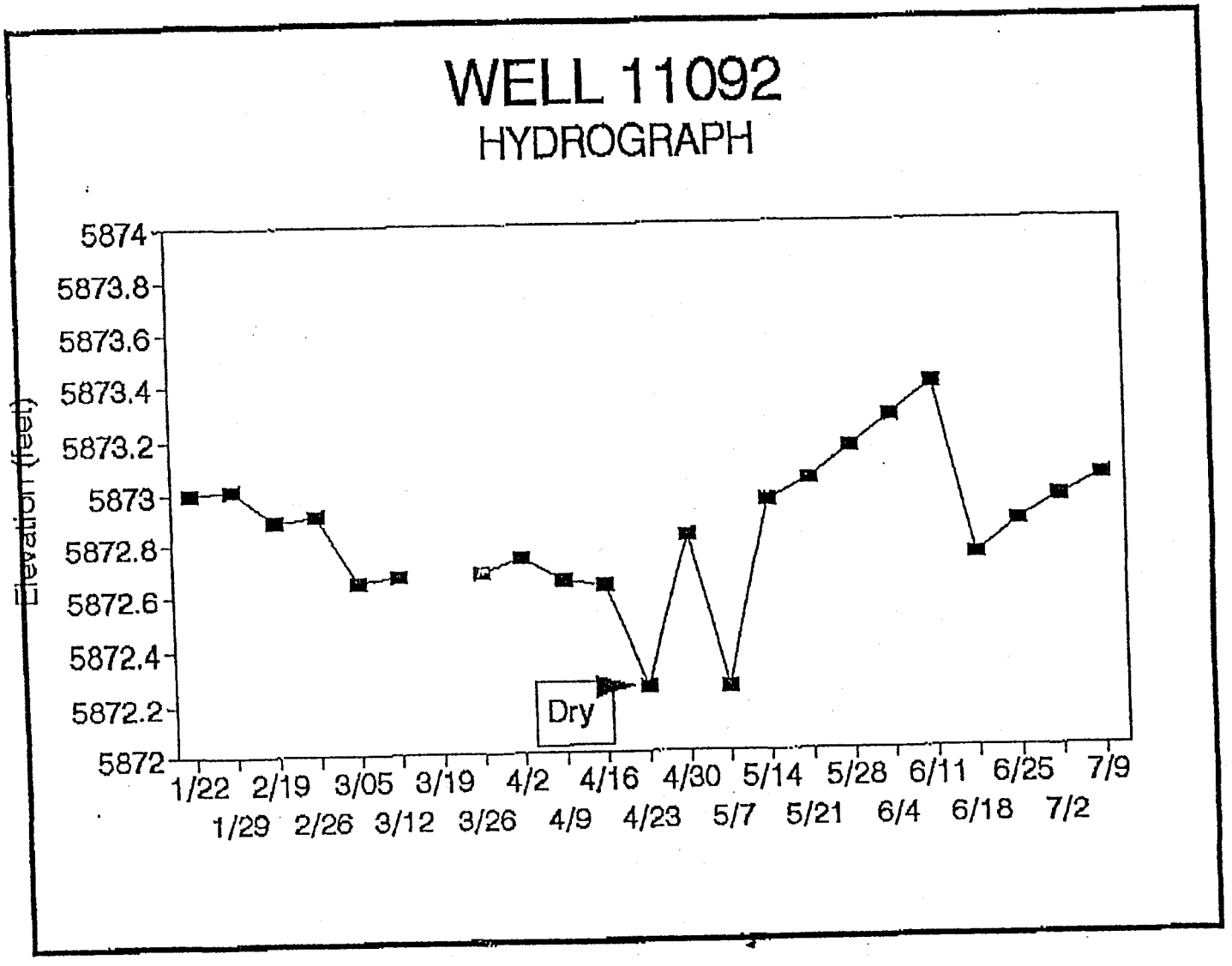

WELL 10792
HYDROGRAPH
Elevation (feet)
5894.5
5894
5893.5
5893
5892.5
5892
5891.5
5891
5890.5
Dry
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9


WELL 10892
HYDROGRAPH
Elevation (feet)
5904
5903.8
5903.6
5903.4
5903.2
5903
5902.8
5902.6
5902.4
5902.2
5902
Dry Well
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9


WELL 10992
HYDROGRAPH
Elevation (feet)
5868
5867.5
5867
5866.5
5866
5865.5
5865
5864.5
Dry
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9


WELL 45391
HYDROGRAPH
Elevation (feet)
5884
5882
5880
5878
5876
5874
5872
5870
5868
Dry
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9


WELL 39991
HYDROGRAPH
Elevation (feet)
5924
5922
5920
5918
5916
5914
5912
5910
5908
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9


WELL 11092
HYDROGRAPH
Elevation (feet)
5874
5873.8
5873.6
5873.4
5873.2
5873
5872.8
5872.6
5872.4
5872.2
5872
Dry
1/22
1/29
2/19
2/26
3/05
3/12
3/19
3/26
4/2
4/9
4/16
4/23
4/30
5/7
5/14
5/21
5/28
6/4
6/11
6/18
6/25
7/2
7/9

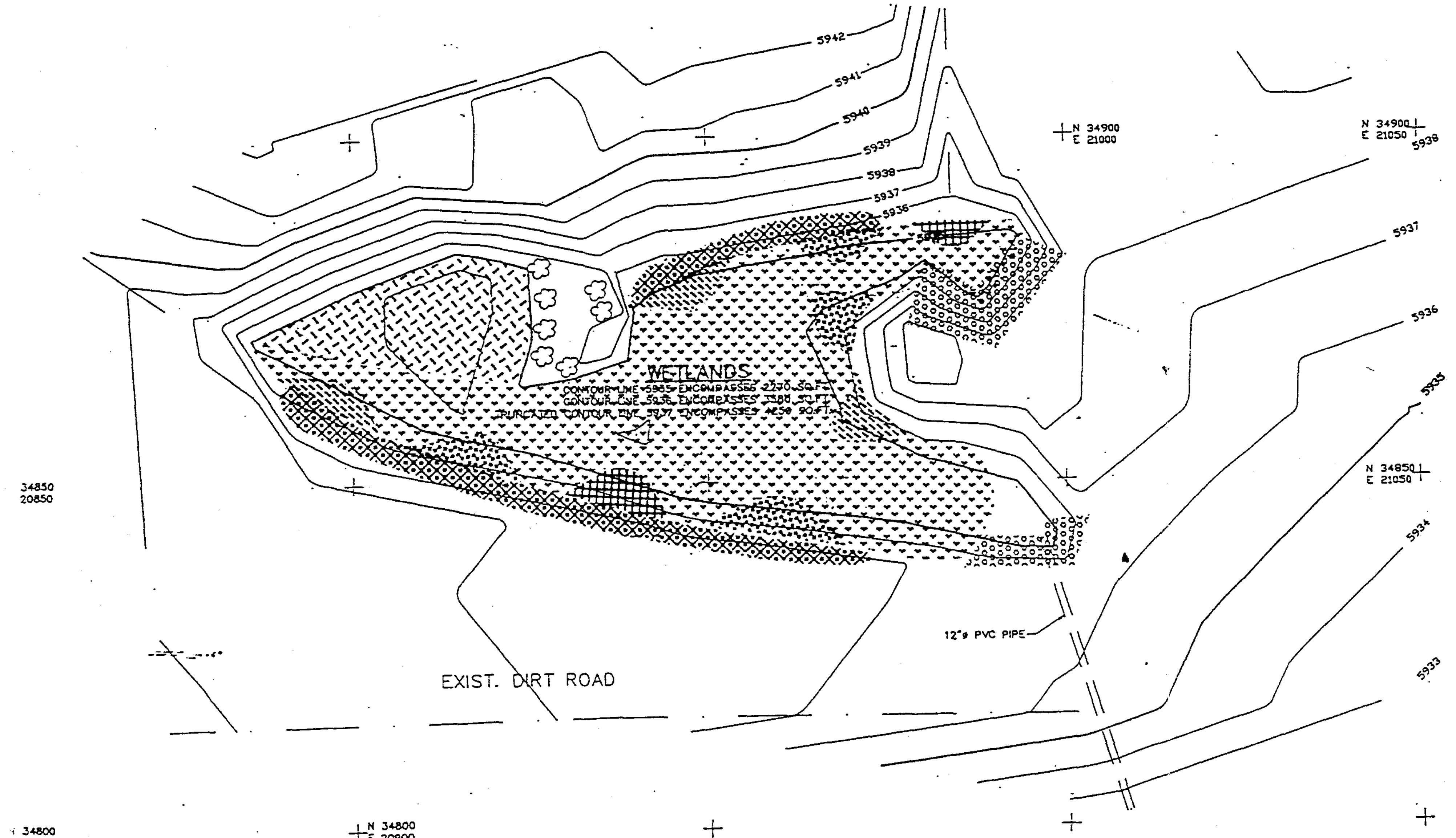
NOTES:

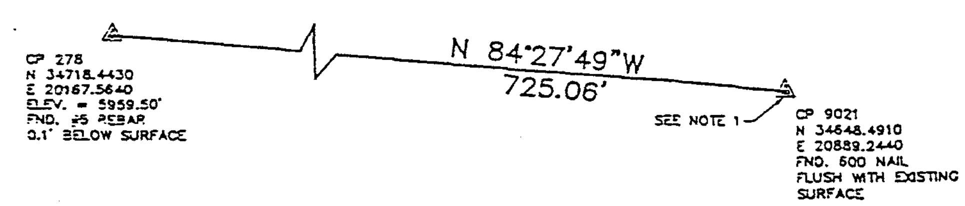
1. CONTROL POINT #9021 IS NOT IN TRUE GEOGRAPHICAL LOCATION AND SHOULD BE USED FOR REFERENCE ONLY. PUBLISHED COORDINATES ARE CORRECT AND ROCKY FLATS PLANT GRID. LOCATION IS APPROX 150' SOUTH ON SOUTH BANK OF SOUTH INTERCEPTOR DITCH.

OU1 WETLAND REVEGETATION PLAN

CONSTRUCTED WETLANDS

C:\DCA\P\WETLAND1\989022-A.DWG
SCALE: 1"=10', CONTOUR INTERVAL = 1.0'
BASIS OF BEARINGS AND COORDINATES ARE ROCKY FLATS PLANT GRID
DATA COLLECTION FILE: DCA\P\WETLAND1\COGO\989022.FBK
SEE FB7/65 FOR CP278 & CP9021 REFERENCES
DATE OF FIELDWORK 3-24-93





LEGEND

- CONTROL POINT
- STOP SIGN
- TRANFORMER
- POST INDICATOR VALVE
- PHONE PEDESTAL
- MANHOLE
- POWER POLE
- EDGE OF ROAD
- WELL
- GUY/ANCHOR
- DRAINLINE
- LIGHTPOLE OR LP PEDESTAL
- SPRINKLER FIXTURE
- INLET OR GRATE
- APPROXIMATE DRIPLINE OF TREE
- FIRE HYDRANT
- BOLLARD
- WATERVALVE
- SUPPORT PEDESTAL
- GUARDRAIL
- CULVERT/FLARED END SECTION
- CONCRETE BARRIER
- MISCELLANEOUS PIPE
- POWER PANEL
- CONCRETE PIER TIE DOWN
- AIR MONITORING STATION
- RIP RAP
- MISC. TREES

N

NOT TO SCALE

Survey Stats
Paul C. Grabowski
P.L.S. 27602

KEY TO SYMBOLS

- Existing cattails
- Planted cattails
- Planted softstem bulrush
- Planted three-square bulrush
- Planted mixed bulrush
- Planted sandbar willow

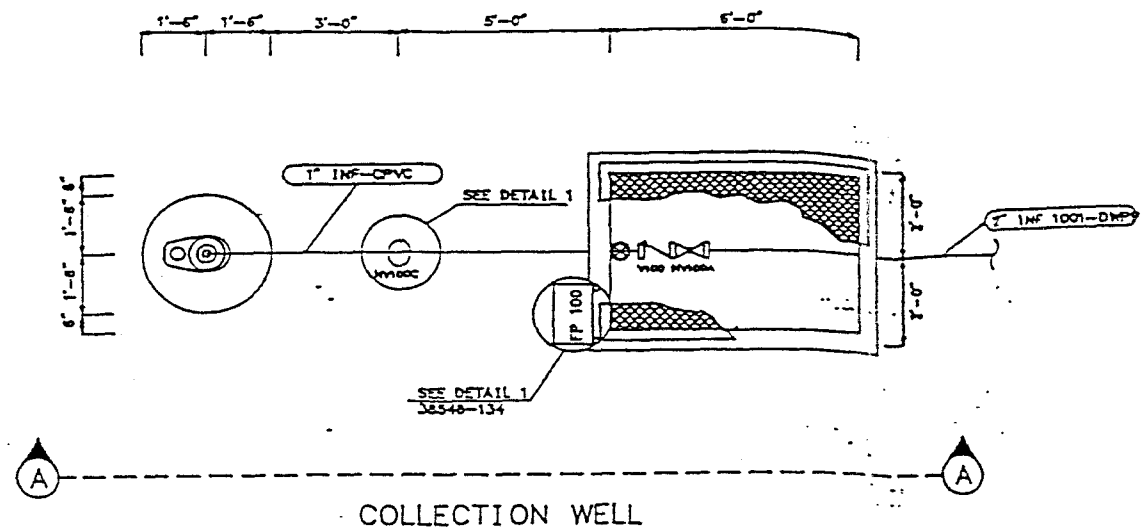
PLANTING DETAILS

Cattails will be planted on one foot centers.

Bulrush will be planted on six inch centers.

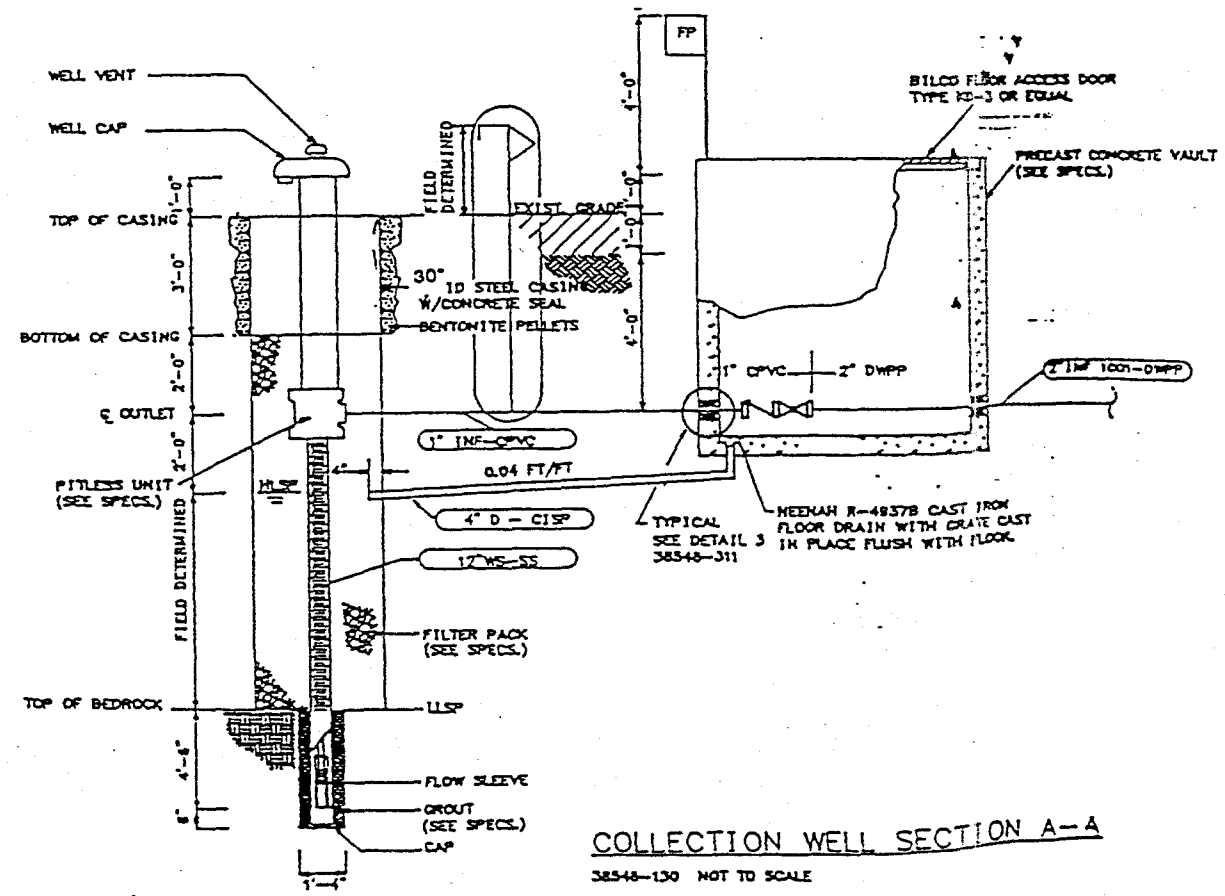
Willow will be planted on three foot centers in rows spaced one foot apart, with each row offset one foot from the adjacent row.

FIGURE 7



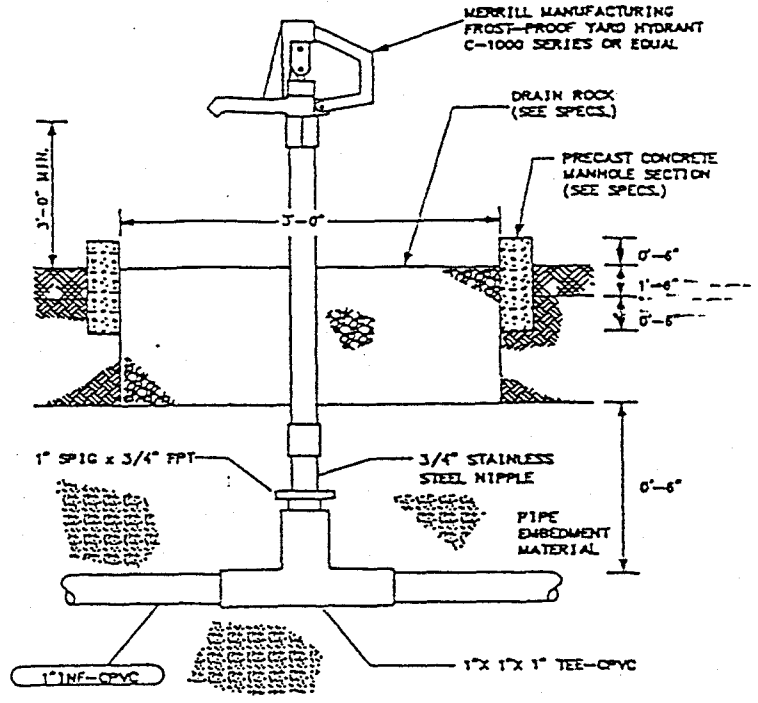
COLLECTION WELL
AND METER/VALVE VAULT PLAN VIEW

38548-130 NOT TO SCALE



COLLECTION WELL SECTION A-A

38548-130 NOT TO SCALE



DETAIL 1
FROST-PROOF HYDRANT

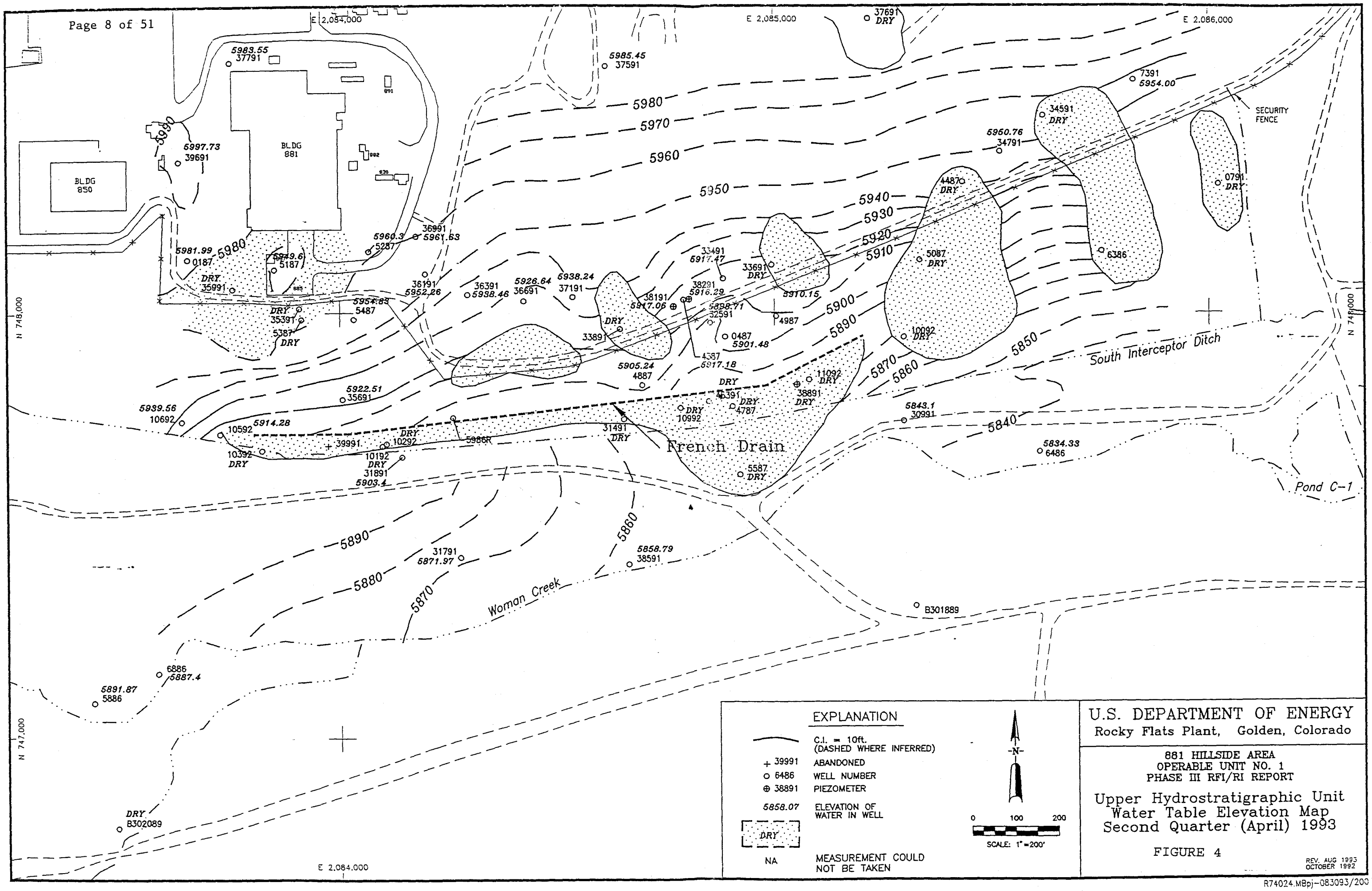
38548-134, 135 NOT TO SCALE

FIGURE 2

A	ORIGINAL ISSUE				986147
					U.S. DEPARTMENT OF ENERGY ROCKY FLATS AREA OFFICE GOLDEN, COLORADO
					ROCKY FLATS PLANT P.O. BOX 464 GOLDEN, COLORADO 80402
					Remedial Action 881 HS, 851
					Collection Well Details
SCALE AS NOTED				D	38548-135 A 14 of 24

ENGINEERING-SCIENCE JOSEPH SCHLANGER PLANNER

COMPUTER GENERATED DRAWING NO MANUAL CHANGES ALLOWED



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